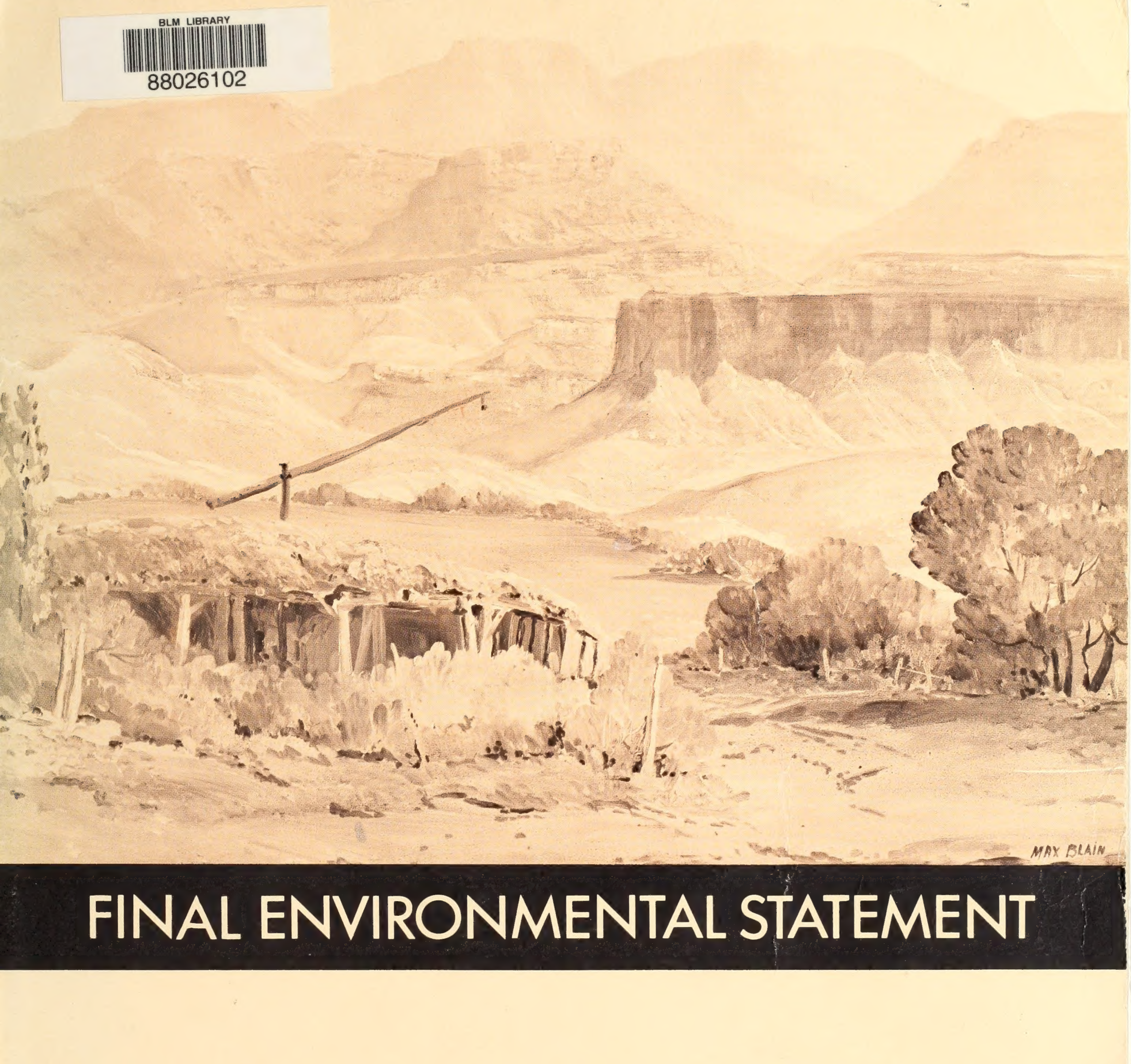

FINAL ENVIRONMENTAL STATEMENT

EMERY

United States Department of the Interior — Bureau of Land Management

ERRATA SHEET

Section B.1., Federal Authorizing Actions (Page 1-5 to 1-9) does not adequately reflect Public Law 94-579 (90 Stat. 2743), Federal Land Policy and Management Act of 1976 as it relates to the Bureau of Land Management and U.S. Forest Service.

If the project is approved, the required actions would be carried out under existing procedures, but under the authority provided by Pubic Law 94-579.

DEPARTMENT OF THE INTERIOR

FINAL

ENVIRONMENTAL STATEMENT

EMERY POWER PLANT

Prepared by

BUREAU OF LAND MANAGEMENT
DEPARTMENT OF THE INTERIOR

Curt Berklund
Director, Bureau of Land Management

SUMMARY

( ) Draft (X) Final Environmental Statement

Department of the Interior
Bureau of Land Management
Utah State Office

1. Type of action: (X) Administrative ( ) Legislative

2. Brief Description of Action: Utah Power and Light Company, Salt Lake City, Utah, has proposed to construct and operate two 430 megawatt coal-fired steam-electric generating units in Emery County, Utah. Two 345 kilovolt transmission lines, 191 miles in total, would deliver power to substations near Camp Williams and Sigurd, Utah. A third line, 118 miles long, would be built to tie the Camp Williams and Sigurd substations together. Coal would be mined from the underground Wilberg Mine, and transported to the plant.

3. Summary of Environmental Impacts and Adverse Environmental Effects:
The generating plant, mine, support facilities, and transmission system would occupy 1,788 acres of land.

If air pollution control equipment can be operated at design levels, the plant would emit 5.29 tons of particulates, 70 tons of nitrogen oxide, and 92 tons of sulfur dioxide per day using the worst-grade coal. These stack emission levels would equal, or better, the applicable air quality standards. Small amounts of radioactive elements and other trace elements would be released to the atmosphere. Plume opacity would be less than the current 20 percent opacity limitations. Stack emissions could also cause a reduction in visibility and could produce an evident yellow discoloration of the air. The project as proposed may not meet the air quality limitations of the Class II increments under the Prevention of Significant Deterioration Regulations. However, the Class II increments could be met with up to 56 percent sulfur dioxide control. The proposed project would be within a 100-mile radius of a number of National Parks, National Recreation Areas, National Monuments, and National Forests, all of which have the potential for redesignation to a Class I area in which practically any change in air quality would be considered significant.

The generating complex would consume about 7,000 acre-feet of water annually and 2,400,000 tons of coal. Solid waste totaling 8,687,000 tons, covering 160 acres would be produced in the 35 year economic life of the plant.

Several archaeological and historical sites and trails are along the proposed transmission routes, but no known sites have been nominated for the National Register of Historic Places.

The proposed project would create a peak employment of 1,090, and would ultimately employ about 800 persons. A population increase of 4,942 in Carbon and Emery Counties, Utah, would be attributed to the project.

4. Alternatives Considered: Garfield East and West, Sevier, Cedar Valley, Little Mountain, and Huntington sites, plant design and operating methods, coal sources, mining techniques, slurry pipe line, coal conveyor belt, water transportation methods, water sources, transmission line routes and design, other energy sources, energy conservation, delay, and no action, are considered.

5. Comments Have Been Requested From the Following: Attached is a list of federal, state, and nongovernment agencies with jurisdiction and expertise which received copies of the draft statement. Comments were received from those agencies indicated by an asterisk.

6. Date Statement Made Available to CEQ and the Public:
Draft Statement: August 6, 1976
Final Statement:

ATTACHMENT

Organizations Which Received a Copy of the Draft Statement

Federal

- Advisory Council on Historic Preservation*
- Department of Agriculture
  - Forest Service*
  - Soil Conservation Service*
- Department of Commerce
  - National Oceanic and Atmospheric Administration
- Department of Defense
- Department of Health, Education and Welfare*
- Department of Housing and Urban Development*
- Department of the Interior
  - Bonneville Power Administration*
  - Bureau of Indian Affairs
  - Bureau of Mines*
  - Bureau of Outdoor Recreation*
  - Bureau of Reclamation
  - Fish and Wildlife Service*
  - Geological Survey*
  - Mining Enforcement and Safety Administration
  - National Park Service*
  - Office of the Solicitor*
  - Power Marketing Administration
- Department of Labor
  - Occupational Safety and Health Administration
- Department of Transportation*
  - Federal Aviation Administration*
  - Federal Highway Administration
- Energy Research and Development Administration
- Environmental Protection Agency*
- Federal Energy Administration*
- Federal Power Commission
- Interstate Commerce Commission

State

- State of Utah
  - Bureau of Environmental Health*
  - Department of Transportation*
  - Division of Lands
  - Division of Wildlife Resources*
  - Governor's Clearing House*
  - State Archaeologist
  - State Planning Coordinator*
  - Upper Colorado River Basin Commission

ATTACHMENT (Continued)

Local

- Board of County Commissioners
  - Carbon, Emery, Garfield, Salt Lake, Sanpete, Sevier, Utah, and Weber
- Mayors of Castle Dale, Emery, Escalante, Ferron, Helper, Huntington, Orangeville, Ogden, Price, Provo, and Richfield
- Six County Commissioners Organization
- Southeastern Association of Governments

Nongovernmental Organizations

- Archaeological Society of Utah
- Boulder Mountain Packers
- Canyon County Coalition
- Chamber of Commerce (Carbon County)
- Chamber of Commerce (Salt Lake Area)
- Common Cause
- Conservancy Resource Center
- Council of Utah Resources
- Defenders of the Outdoor Heritage
- Defenders of Wildlife
- Desert Protective Council
- Enchanted Wilderness Association
- Environmental Awareness
- Environmental Defense Fund, Rocky Mountain/Great Plains*
- Escalante Wilderness Committee
- Friends of the Earth*
- Good Earth
- Institute of Ecology
- Isaac Walton League - Utah Division
- ISSUE
- League of Women Voters
- Mearns Wildlife Society
- Mineralogical Society of Utah
- National Parks and Recreation Association
- National Resources Defense Council, Inc.
- National Wildlife Federation
- Nature Conservancy
- Pro-Utah, Inc.
- Rocky Mountain Center on Environment
- Rocky Mountain Federation of Mineralogical Societies
- Rocky Mountain Sportsmen Association
- Save Our Canyons Committee
- Sierra Club*
- Society of Conservation of Bighorn Sheep
- Utah Audubon Society
- Utah Cattlemen's Association
- Utah CLEAR
- Utah Environment Center*

ATTACHMENT (Continued)

- Utah Farm Bureau
- Utah Geological and Mineral Survey
- Utah Lung Association
- Utah Mining Association
- Utah Nature Study Society
- Utah Sportsmen Association
- Utah Water Users Association
- Utah Wildlife and Outdoor Recreation Federation
- Utah Wool Growers Association
- Wasatch Mountain Club
- Western Rockhound Association
- Wilderness Society of America
- Women's Conservation Council of Utah

Private Companies, Universities

- American Coal Company*
- Brigham Young University*
- Intermountain Consumers Power Association*
- Peabody Coal Company*
- Utah Power & Light Company*
- Utah State University*

FOREWORD

This Final Environmental Statement was prepared in compliance with the National Environmental Policy Act of 1969, Public Law 91-190. The statement presents a full disclosure of impacts associated with governmental actions that would be needed to authorize the granting of rights-of-way pertaining to the applicant's proposals.

The Department of the Interior has designated the Bureau of Land Management as the lead agency responsible for preparation of the Environmental Statement. The U.S. Forest Service, U.S. Geological Survey, and Bureau of Reclamation have participated in preparation of the statement by providing interdisciplinary team members.

The Utah Power and Light Company proposes a project which includes the building of two generating units (each rated at 430 megawatts) and other support facilities. The Federal Government has defined and analyzed expected environmental impacts, adverse effects that cannot be avoided, and alternatives to the proposal. This statement will provide the Department of the Interior and the Department of Agriculture with a comprehensive basis for analysis and decision-making.

On December 12, 1973, the State of Utah issued a letter authorizing the Utah Power and Light Company to construct a generating plant on nonfederal land in Emery County (Appendix I-1). The Environmental Protection Agency issued a water discharge permit to Utah Power and Light. The Utah Department of Transportation issued an encroachment permit for the culinary water pipe line to cross Utah State Highway 10. Emery County rezoned the plant site from agricultural to industrial use by vote of the county commissioners, September 5, 1975 (Zoning and

Planning Authority - Utah Code Annotated 1953, as amended, Chapters 17 to 27). The commissioners have indicated that they will not require Utah Power and Light to purchase and obtain a building permit.

The generating complex would occupy approximately 2,000 acres of a total of 3,430 acres of land owned by Utah Power and Light in the immediate vicinity of the site. Of the unoccupied 1,430 acres, 800 acres of irrigated crop land would be retired.

In September 1974, while preliminary work was being conducted on the Draft Environmental Statement, Utah Power and Light began installation of drain tiles at the plant site. In March 1975, construction began on the generating complex. By September, 1975, the turbine pedestal was poured and structural steel placed to the 100-foot level, and by the middle of December, 1976, project construction was 35 to 40 percent complete.

For the preparation of the Environmental Statement the Bureau of Land Management, as lead agency, established an interdisciplinary team. The team made an extensive review of all alternative proposals for both the power plant and the transmission lines.

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CHAPTER 1

DESCRIPTION OF THE PROPOSAL

CHAPTER 1

DESCRIPTION OF THE PROPOSAL

A. INTRODUCTION

Chapter 1 describes the applicant's proposed action and government actions that would be required if the proposal were approved (i.e., granting rights-of-way, issuance of licenses or permits, review and approval of plans, etc.). Related projects, proposals, and land use plans are also discussed. Five environmental impact statements have been prepared for five generating complexes in the area (two were written for Huntington, none for Carbon); a list of the statements is included in this chapter. The applicant's proposal, purpose for the project, site selection process, and description of project components, are presented. Only components of the project that would significantly affect the human environment are described in detail.

The Utah Power and Light Company (UP&L) is building a coal-fired steam electric generating complex in Emery County, Utah. When complete the complex would occupy approximately 2,000 acres of UP&L-owned land south of Castle Dale, Utah. Figure 1-1 shows the complex as it appeared in December, 1976. (Figure 1-2 shows the general location of the generating complex in relation to the State of Utah.) The complex would consist of two 430 megawatt (MW) rated units and ancillary facilities. The generating units would have an economic life of 35 years and would consume up to 2,400,000 tons of coal annually. A summary of quantities is shown in Table 1-1.

Prior to selection of the Emery site in 1974, UP&L and its consultants analyzed 22 other sites (including two nuclear). A summary

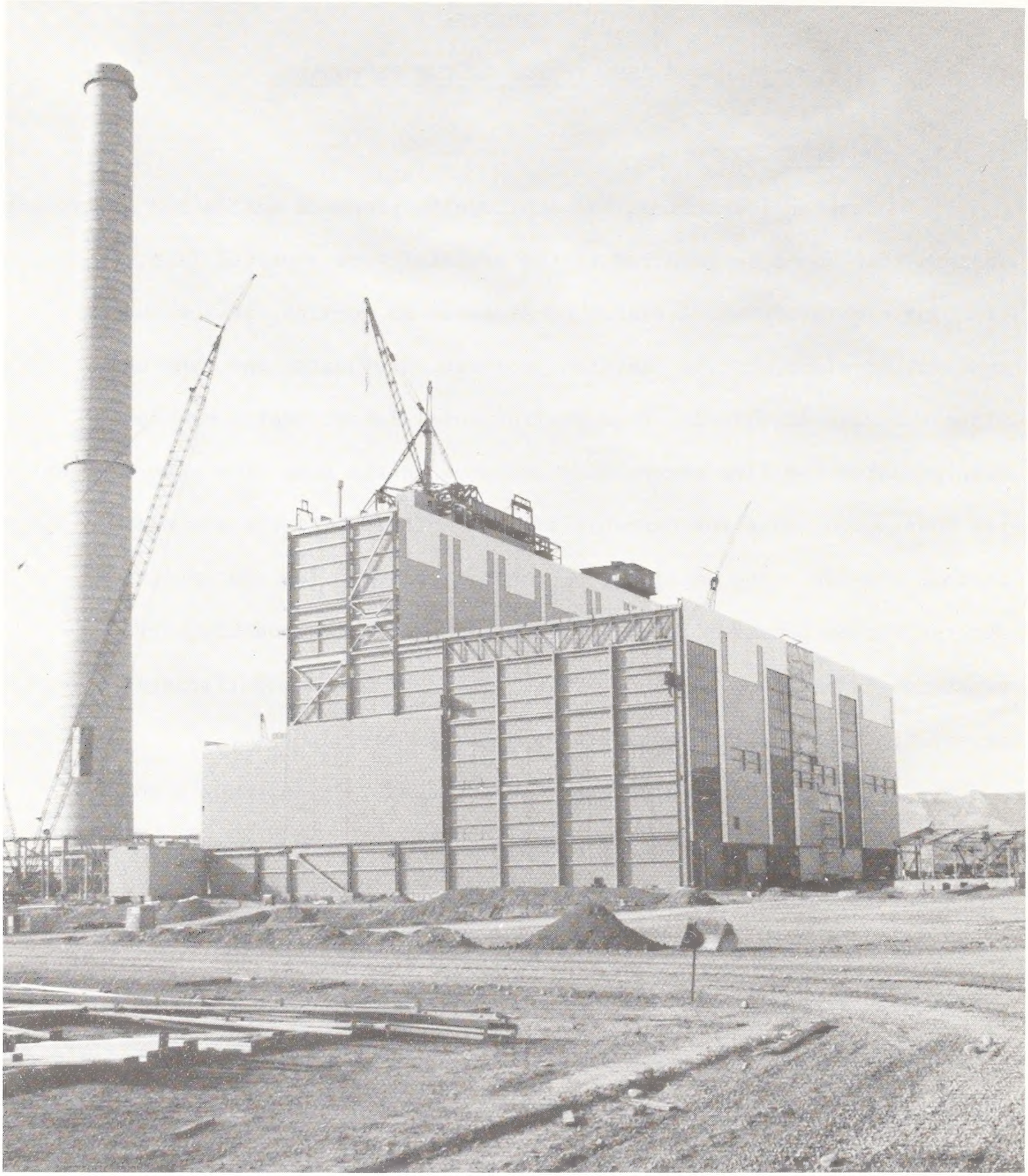


FIGURE 1-1

EMERY GENERATING COMPLEX
(DECEMBER, 1976)

FIGURE 1-2

SITE LOCATION MAP

TABLE 1-1

Summary of Quantities

	Power Plant	Coal Source	Power Transmission System	Haul Roads	Switchyard	Water Pipe Line
Land	Approximately 2,000 acres in generating complex, 1,480 disturbed or permanently occupied.	100 acres disturbed and occupied.	281 acres disturbed in rights-of-way construction. 309 mi of transmission line (3 systems).	11 mi. from live storage area to plant. 4.1 mi new construction.	Occupy 23 acres.	11 mi underground, 33 acres disturbed during construction, 11 acres permanently occupied.
Coal	84,000,000 tons burned during projected 35-year plant life.	84,000,000 tons from Hiawatha and Bear Canyon seam of Wilberg Mine.				
Water	7,000 acre-ft/yr for total plant usuage. Six ponds to occupy 62 acres. Total capacity 645 acre-ft.	16 acre-ft/yr culinary water required.				
Solid Waste	680 ton/day ash to fill 160 acres to depth of 15-25 ft.					
Sulfur Dioxide	92 ton/day.					
Nitrogen Dioxide	70 ton/day.					
Particulate	5.29 ton/day.					
People	1,090 at peak employment in 1979. Operating employees would level off at 203 in 1980.	Miners would level off at 600 in 1980.		46 trucks drivers would be needed.		

of their site selection criteria is included in Appendix I-2. Chapter 8 further discusses alternative sites. The Company prepared and submitted to the Bureau of Land Management (BLM) "Applicant's Environmental Analysis," October 1973, revised December 1973. A copy of this is on file at the BLM office in Richfield, Utah.

Based on the statement from UP&L at the initiation of preparation of the document, and a letter in response to BLM's inquiry (Appendix I-3) from the Division of Health, State of Utah (Appendix I-4), this environmental statement (ES) analyzes the impact of the plant as constructed without sulfur dioxide (SO_2) control. However, SO_2 control versus having no SO_2 control is analyzed in Chapter 8.

The BLM became particularly concerned as UP&L proceeded with the construction of the power complex during the preparation of the ES, and a letter was written to UP&L indicating the concern. Utah Power and Light replied by letter, supporting their current construction activities at the Emery site. Copies of the correspondence are included in Appendices I-5 and I-6.

B. GOVERNMENT AUTHORIZING ACTIONS

It must be emphasized that UP&L is the proponent of the Emery project. However, in order to allow the project to be completed, it would be necessary for the Federal and State Governments to take several actions. The federal actions which would authorize the applicant's proposals, are the key actions that necessitated preparation of this ES.

1. Federal Authorizing Actions

a. Bureau of Land Management

The BLM would:

(1) Grant a 100-foot tramway right-of-way for the coal conveyor from the Wilberg Mine across 0.5 mile of national resource lands (lands under management of BLM) to the coal storage area (Act of January 21, 1895; 28 Statute (Stat) 635; 43 United States Code (U.S.C.) 956; 43 Code of Federal Regulations (CFR), Part 2810). This act authorizes the Secretary of the Interior to permit the use of rights-of-way over national resource land for tramroads associated with mining, quarrying, cutting timber, etc. Tramroads are considered to include tramways, railroads, and motor truck roads (CFR 2811.0-5).

(2) Grant a 130-foot right-of-way for the Emery-Spanish Fork Canyon-Camp Williams transmission line, including 3 miles of dirt access and service road, to cross approximately 17 miles of national resource land (Act of March 4, 1911; 36 Stat. 1253; 43 U.S.C. 961, as amended; 43 CFR, Part 2850).

(3) Grant a 130-foot right-of-way for the Emery-Salina Canyon-Sigurd transmission line to cross approximately 18 miles of national resource land (Act of March 4, 1911; 36 Stat. 1253; 43 U.S.C. 961, as amended; 43 CFR, Part 2850). No new service or access roads would be required in this right-of-way.

(4) Grant a 130-foot right-of-way for the Sigurd-Camp Williams transmission line to cross approximately 34 miles of national resource land (Act of March 4, 1911; 36 Stat. 1253; 43 U.S.C. 961, as amended; 43 CFR, Part 2850).

The act referenced in items (2), (3), and (4) above authorizes the Secretary of Interior, under such regulations as he may fix, to

permit the use of rights-of-way over public lands for the installation of poles and lines for the transmission and distribution of electrical power.

(5) Issue a special land use permit for the approximately 2-acre mine material storage area (Revised Statute [R.S.] 446, 453 and 2478, as amended; 43 U.S.C. 1,2, 1202; Act of July 14, 1960; 70 Stat. 506; 43 U.S.C. 1361, 1364).

(6) Issue a special land use permit for approximately 54 acres of national resource lands for a permanent coal storage pile with reclaim and load out facility at the termination of the feeder coal mine conveyor (R.S. 446, 453 and 2478, as amended; 43 U.S.C. 1,2, 1201; Act of July 14, 1960; 70 Stat. 506; 43 U.S.C. 1361, 1364; 43 CFR, Part 2920).

(7) Grant a special land use permit for approximately 3.0 acres for a leach field for waste water disposal on national resource lands (R.S. 446, 453 and 2478, as amended; 43 U.S.C. 1,2, 1201; Act of July 14, 1960; 70 Stat. 506; 43 U.S.C. 1361, 1364; 43 CFR, Part 2920).

(8) Grant a 30-foot right-of-way for a sewer line over 0.1 mile of national resource lands (Act of February 15, 1901; 31 Stat. 790; 43 U.S.C. 959; 43 CFR, Subpart 2873).

For Paragraphs (5) through (8) above, the 43 CFR, Part 2920, authorizes the Director of the BLM to perform under the direction of the Secretary of Interior all executive duties relating to the public lands, including issuance of special land use permits.

b. U.S. Geological Survey

The U.S. Geological Survey (USGS) would approve the mining plan and administer operation of coal leases at Wilberg Mine, and in consultation with the U.S. Forest Service, approve the surface facilities plan within the boundaries of the coal lease (Section [Sec.] 32 of Act of February 25, 1920, 41 Stat. 450; 30 U.S.C. 189; Sec. 10 of Act of August 7, 1947, 61 Stat. 915; 30 U.S.C. Part 211; Secretarial Order No. 2948, October 6, 1972; 43 CFR Part 23). These acts and order authorize the Secretary of Interior to prescribe the necessary and proper rules and regulations to promote the mining of coal and other leasable minerals.

c. U.S. Forest Service

The U.S. Forest Service (USFS) would:

(1) Consult with USGS, before they approve the surface facilities plan within the boundary of the coal lease on National Forest land.

(2) Grant a 100-foot special use permit for a coal conveyor from Wilberg Mine to cross approximately 0.8 mile of Manti-La Sal National Forest.

(3) Grant a 130-foot special use permit for Emery-Spanish Fork Canyon-Camp Williams transmission line to cross approximately 16 miles of Uinta National Forest land and 1 mile of the Manti-La Sal National Forest.

(4) Grant a 130-foot special use permit for Emery-Salina Canyon-Sigurd transmission line to cross approximately 20 miles of Fishlake National Forest land.

(5) Grant a 30-foot special use permit for the sewer line to cross approximately 0.7 mile of Manti-La Sal National Forest.

(6) Grant a 10-foot special use permit for 0.5 mile of pipe line across the Manti-La Sal National Forest to conduct excess mine water from the Wilberg to the Anderson Mine.

Authority for issuance of grants indicated in (1) through (6) above is contained in the Organic Act of June 4, 1897; 30 Stat. 34, as amended and supplemented; 16 U.S.C. 460, 471-594, 616, 594, 1131-1136; 33 U.S.C. 701; U.S.C. 1010-1013a; 36 CFR 200.3 et seq. The Organic Act of June 4, 1897 enables the Secretary of Agriculture to make provisions to protect National Forests and regulate use thereon.

d. Bureau of Reclamation

The Bureau of Reclamation (USBR) would issue a license to construct approximately 1 mile of transmission line in a 120-foot corridor across a Bureau of Reclamation withdrawal east of Utah Lake (Act of June 17, 1902, 32 Stat. 388 as amended and supplemented).

e. Federal Communications Commission

The Federal Communications Commission (FCC) would grant a license for addition of a dish-type microwave antenna to the existing tower on Cedar Mountain and construction of a microwave tower and dish-type antenna on the generating complex site (Act of June 19, 1934 as amended; 48 Stat. 1082; 47 U.S.C. 303; 47 CFR 1.70). This act authorizes the FCC to regulate interstate and foreign communications by wire and radio, so as to make available to all people rapid and efficient nationwide and worldwide communication service.

f. Federal Aviation Agency

The Federal Aviation Agency (FAA) would issue an air space

permit assuring that two 600-foot concrete stacks at the generating complex comply with FAA laws and regulations relating to objects affecting navigable air space (Federal Aviation Act of 1958, Public Law [P.L.] 850726, August 23, 1958, 72 Stat. 749; 797; 49 U.S.C. 1347, 1501; 14 CFR Part 77). This act provides for the regulation and promotion of civil aviation in such a manner as to best foster its development and safety, provide for the safe and efficient use of air space by both civil and military aircraft, and for other purposes.

g. Environmental Protection Agency

The Environmental Protection Agency (EPA) would issue a national pollutant discharge elimination system permit for the emergency discharge of excess mine water into Grimes Wash.

2. State Authorizing Actions

a. Utah Division of State Lands

The Utah Division of State Lands would:

(1) Grant a 130-foot right-of-way for Emery-Spanish Fork Canyon-Camp Williams transmission line to cross approximately 6 miles of state land.

(2) Grant a 130-foot right-of-way for Emery-Salina Canyon-Sigurd transmission line to cross approximately 4 miles of state land. No new service or access roads would be required in this right-of-way.

(3) Grant a 130-foot right-of-way for Sigurd-Camp Williams line to cross approximately 13 miles of state land.

For grants indicated in paragraph (1) through (4) above, the Utah Code Annotated (U.C.A.) 1953 as amended, 65-2-1, states that the

State Land Board may grant rights-of-way on, through, and over any state lands for the transmission of electrical energy or for telephone or telegraph lines, for canal and irrigation companies and for roads, etc.

b. Utah Department of Transportation

The Utah Department of Transportation would:

(1) Issue encroachment permits at State Highways 10 and 29 for the coal haul road underpasses from Wilberg Mine and raw water pipe line from Millsite Reservoir to the generating complex.

(2) Issue an encroachment permit for about 3.6 miles of transmission line overhang along I-15 west of Provo.

(3) Issue permits for 16 state and federal highway crossings.

c. Utah State Division of Health, Environmental Health Services Branch

The Utah State Division of Health would:

(1) Issue permits for each component part of the complex as it relates to pollution production and control, e.g., boilers, precipitators, etc. (U.C.A. 1953 as amended, Chapters 24-26).

(2) Approve solid waste disposal plans (U.C.A. 1953 as amended, Title 26).

(3) Issue permits for culinary water source treatment and plumbing facilities within the mine (U.C.A. 1953 Sec. 26-15-4).

(4) Agree to the issuance of a national pollution discharge elimination system by EPA.

3. Local Authorizing Actions

If the proposed Utah County zoning ordinance is passed, the transmission line would violate the ordinance and a variance would be required.

C. RELATED PROJECTS, PROPOSALS, LEGISLATION, AND ENVIRONMENTAL IMPACT STATEMENTS

Several existing or proposed developments in eastern Utah and the Four Corners area are interrelated with the Emery Project because of similar environmental and socioeconomic factors.

1. Generating Complexes

Five coal-fired generating stations (either partially or completely in production) and one recently proposed are related to the proposed Emery project (Figure 1-3). Table 1-2 shows the status of these complexes and their interrelationship with the proposed Emery complex.

2. Mineral Development

During 1973 total coal production in Carbon and Emery counties was approximately 5,000,000 tons. Expansion of production related to the proposed project and other coal development proposals in Carbon and Emery counties is expected to increase coal production to 10,000,000 tons by 1979. Mining personnel are expected to show an increase from 1,607 in 1974 to 3,000 by 1979 (USDI, USGS, 1976). These coal development proposals are related in that they involve the same local socioeconomic situation. Figure 1-4 shows location of the major interrelated coal mining areas likely to increase in production, and Table 1-3 gives

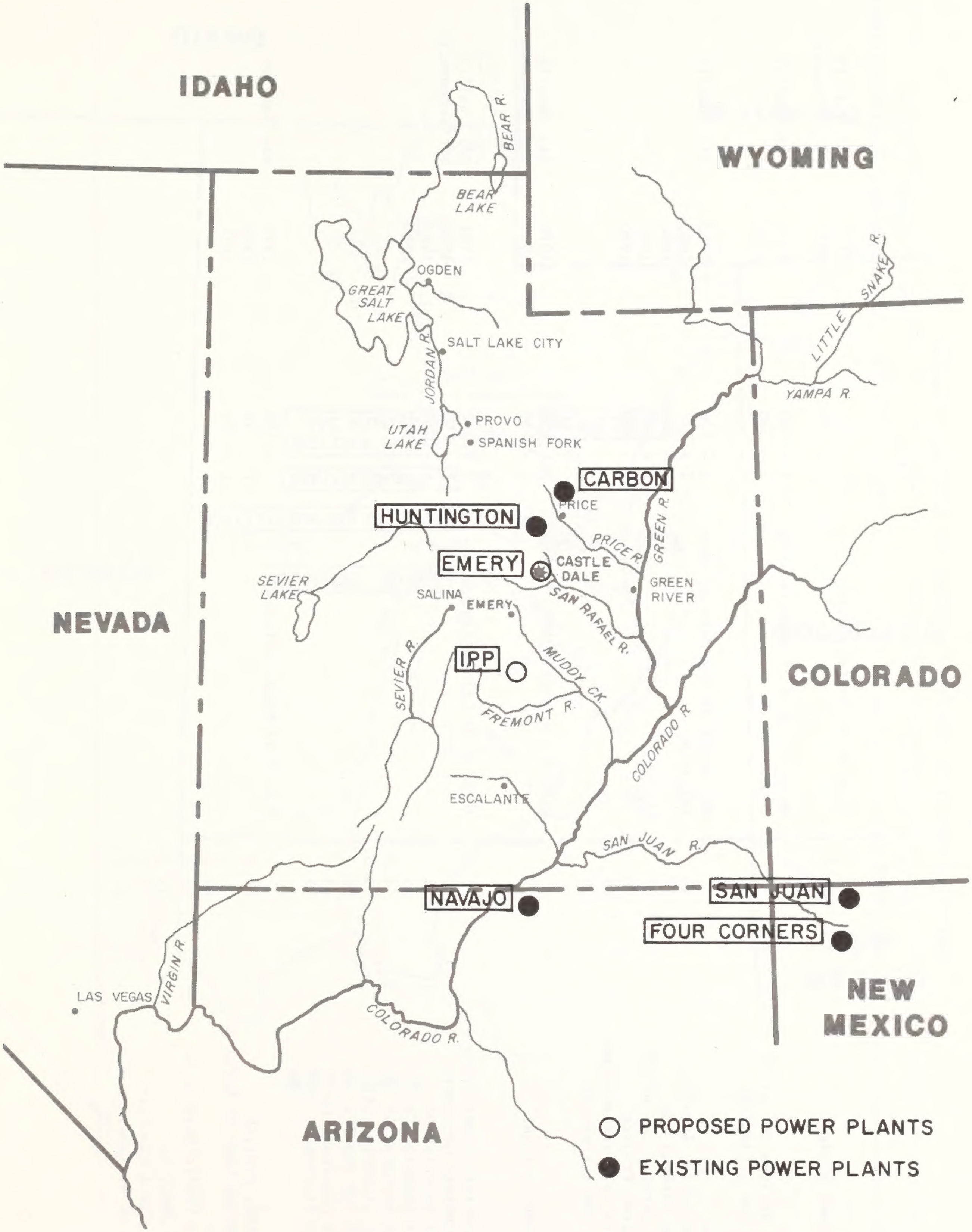


FIGURE 1-3

INTERRELATED GENERATING STATIONS

TABLE 1-2

Coal-Fired Generating Complexes Interrelated With Emery Complex

Development	Percent Owned	Location	Size (no. units) (MW)	Date of Beginning Operation	Possible Interrelationships
Carbon		3 mi NW of Helper, Utah	1 - 100	1957	Air Quality
Utah Power & Light	100		1 - 60	1954	Socioeconomic
San Juan		About 13 mi N of Four Corners power plant	1 - 330	1973	Air Quality
Public Service Co. of NM	50		1 - 330	1975	
Tucson Gas & Electric	50				
Four Corners		NW Corner of New Mexico, near Shiprock	1 - 176	1963	Air Quality
Arizona Public Service	15		1 - 177	1963	
El Paso Natural Gas	7		1 - 220	1964	
Public Service Co. of NM	13		1 - 800	1969	
Salt River Project	10		1 - 800	1970	
Southern California Edison	48				
Tucson Gas & Electric	7				
Huntington		9 mi W. of Huntington, Utah	1 - 430	1974	Air Quality
Utah Power & Light	100		1 - 430	1977	Socioeconomic Water
IPP (Intermountain Power Project		10 mi N of Caineville, Utah	1 - 750	1981	Air Quality
Intermountain Consumers			1 - 750	1982	Socioeconomic
Power Association	15		1 - 750	1983	
City of Anaheim, CA	15		1 - 750	1984	
City of Burbank, CA	2.5				
City of Glendale, CA	2.5				
City of Los Angeles, CA	50				
City of Pasadena, CA	5				
City of Riverside, CA	10				
Navajo		4 mi E of Page, Arizona	1 - 750	1974	Air Quality
Salt River Project	21.7		1 - 750	1975	
Los Angeles Dept of Water &			1 - 750	1976	
Power	21.2				
Arizona Public Service Co	14.0				
Nevada Power Co	11.3				
Tucson Gas & Electric	7.5				
Bureau of Reclamation (US)	24.3				

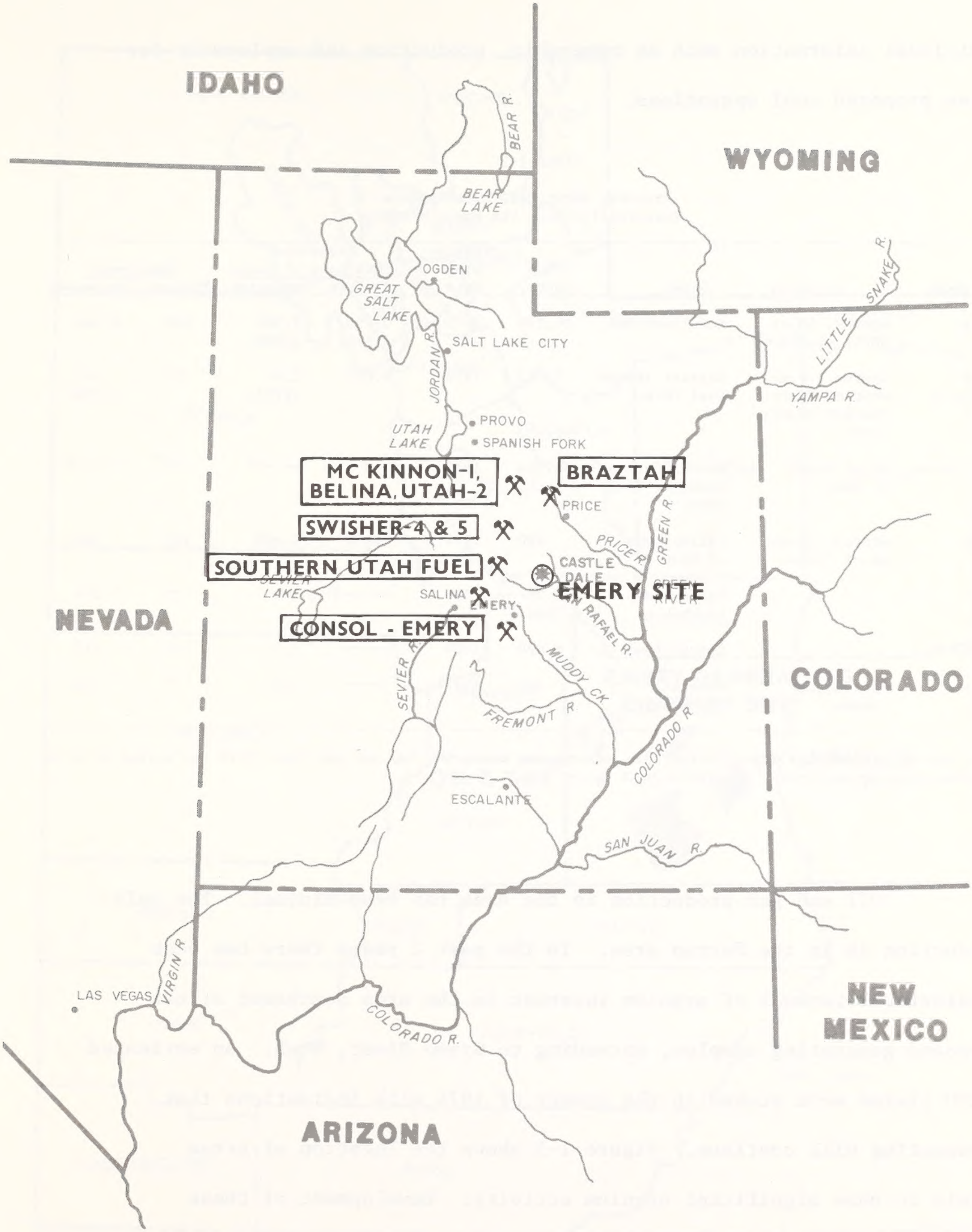


FIGURE 1-4

INTERRELATED COAL MINING AREAS

additional information such as ownership, production and employment for these proposed coal operations.

TABLE 1-3

Proposed Major Coal Developments
Interrelated With the Emery Project

Development	Location	Owner	Size (acre)	Beginning Date	Production (millions of tons) Present	Production (millions of tons) Projected	Employment Present	Employment Projected
Braztah	Approx. 10 mi north of Price	McCulloch Oil	26,220	1975	0.250 (1974)	7.380 (1982)	170	1,400
Southern Utah Fuels	Approx. 10 mi west of Emery (Sevier County, Utah)	Coastal States Coal Corp.	5,752	1976	0.640	2.0 (1978)	85	275 (1978)
Consolidation Emery	10 mi south of Emery	Consolidation - Kemmerer Coal Corp.	33,544	1975	-----[a]	-----[a]	---[a]	-----[a]
Utah #2	Approx. 20 mi NW of Price	Valley Camp of Utah	600	1974	0.300	0.600 (1977)	105	105
Belina	"	Valley Camp of Utah	2,087 (Fed.)	1975	-----	1.0	---	275
McKinnon #1	"	Energy Fuel Co.	6,420	1980	-----	1.5	---	413
Swisher #4 & 5	Huntington Canyon	General Exploration	600	1977	-----	2.0	---	150

[a]Consolidation - Emery has done considerable exploration work, but has not yet identified any market or given any production or employment figures.

Oil and gas production in the area has been minimal. The only production is in the Ferron area. In the past 2 years there has been considerable renewal of uranium interest in the area southeast of the proposed generating complex, extending to Green River, Utah. An estimated 2,000 claims were staked in the summer of 1974 with indications that prospecting will continue. Figure 1-5 shows the location of areas likely to show significant uranium activity. Development of these resources would have socioeconomic interrelationships with the Emery proposal.

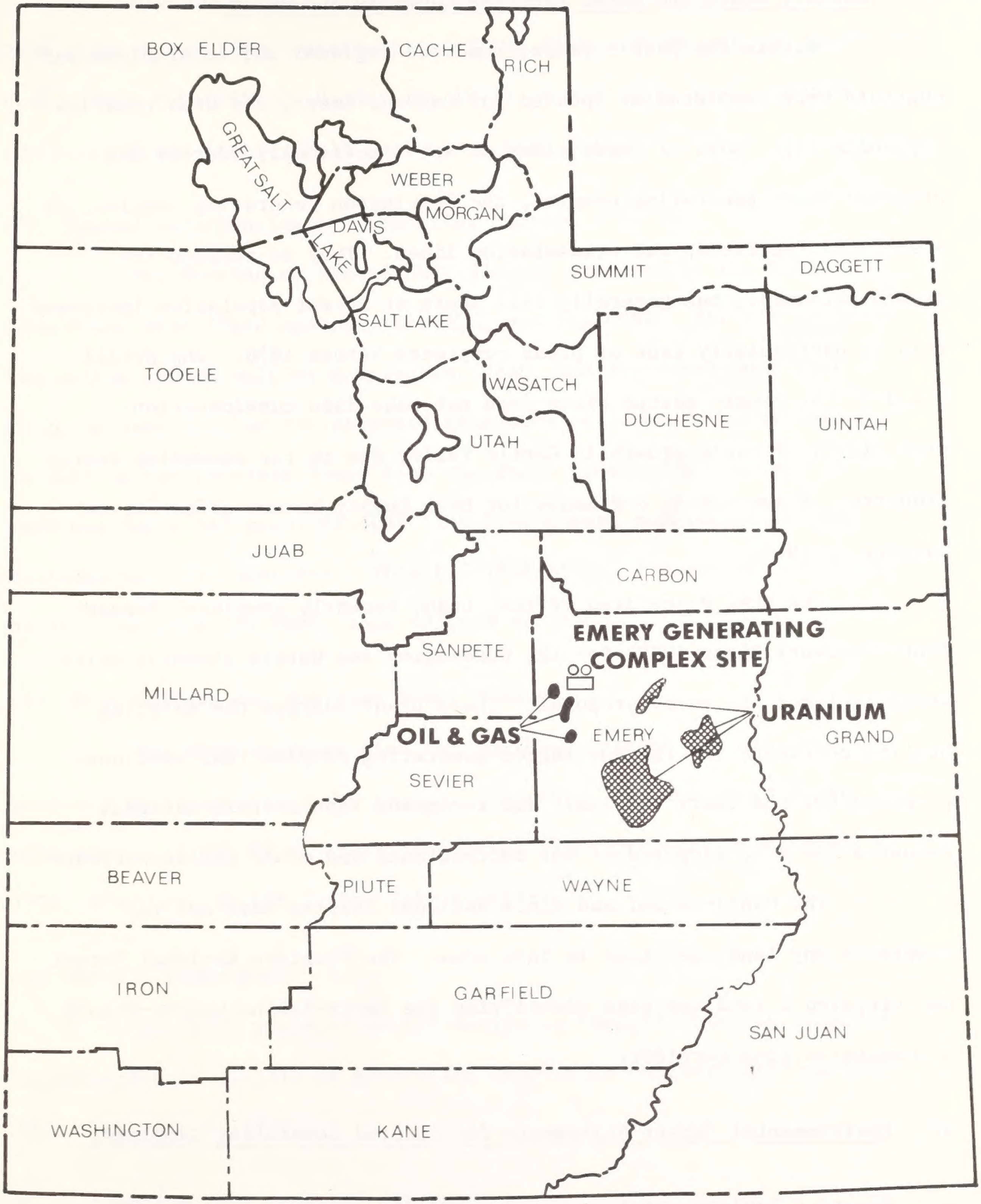


FIGURE 1-5

INTERRELATED OIL, GAS, AND URANIUM AREAS

3. Federal, State and Local Land Use Controls and Plans

Within the past 5 years, numerous regional and local plans and controls were completed or updated for Carbon, Emery, and Utah counties (Appendix II). Most of these plans do not specifically address the proposed Emery generating complex, the Huntington generating complex, or associated facilities and transmission lines. They do address the growth potential, but generally fall short of recent population increases. This is particularly true of plans completed before 1970. The detail found in the county master plans does not take into consideration probability of rapid growth in Castle Valley due to the expanding energy industry. A new zoning ordinance for Utah County became effective on January 7, 1977.

The BLM, Price Area office, Utah, recently completed Management Framework Plans (MFP) for the Huntington and Wattis planning units which includes the Emery proposal. These plans address the existing utility corridors for the Huntington generating complex (the same ones proposed for the Emery complex), and recommend that certain national resource lands be disposed of for recreational and other public purposes.

The Manti-La Sal and Uinta National Forests have not yet completed any land use plans in this area. The Fishlake National Forest has prepared a land use plan identifying the Emery-Salina Canyon-Sigurd transmission line corridor.

4. Environmental Impact Statements for Related Generating Complexes

a. Existing Environmental Impact Statements

(1) First Unit-Huntington Canyon Generating Station and Transmission Lines

This environmental impact statement (EIS) was prepared by the USBR (lead agency) for construction of the first 430-MW unit at Huntington, Utah. This EIS (FES 72-10, May 10, 1972) is available from the USBR, 125 South State Street, Salt Lake City, Utah 84111.

(2) Second Unit-Huntington Generating Station

The Huntington Second Unit EIS was prepared by the USBR, Salt Lake City, Utah (lead agency), the BLM, and the USFS. The EIS analyzed the second 430-MW unit at Huntington, Utah, and four corridors that could be used for the two proposed transmission lines from Huntington, as well as two possible lines from the Emery generating complex. A corridor for a 345 kilovolt (kV) line from Sigurd substation to Camp Williams was also analyzed. This EIS (FES 75-11, January 23, 1975) may be obtained from the USBR, same address as above.

(3) Four Corners and San Juan Power Plants

The USBR prepared EISs for the Four Corners and San Juan projects in northwestern New Mexico. Together, the two power plants will produce 2,800 MW of electrical power (San Juan FES 73-10, March 1, 1973; Four Corners FES 76-36, July 6, 1976).

(4) Navajo Power Plant

The USBR prepared an EIS analyzing impacts from the proposed construction of a 2,310 MW generating complex in northern Arizona (FES 72-1, February 4, 1972).

b. Impending Environmental Statement

The Intermountain Power Project (IPP) proponents and BLM have

begun work on data gathering for preparation of an environmental statement (ES). The proponents are preparing the preliminary proposal for a 3,000 MW generating complex that would be constructed in south-central Utah.

5. Related Studies

The BLM is presently undertaking a regional air quality study. The purposes of the study are to determine functional subareas (or air basins) within the State of Utah and adjoining areas of other states, and to determine how these areas would be influenced by other proposed and existing emission sources. A preliminary draft of this study was completed in November of 1976. This draft study was used to analyze the interaction of various power plants in the area. This analysis is presented in the Air Quality section of Chapter 6.

The Utah State Division of Health, Environmental Health Services Branch, recently conducted a study, based on predictions for 5-year periods beginning in 1980 through 1995, to determine whether the National Ambient Air Quality Standards (NAAQS) will be met in the Utah Air Quality Maintenance Areas (AQMA). Preliminary results indicate that the standards will be met and maintained through 1995.

Legislation was considered (but not passed) in the 94th Congress to amend the Clean Air Act regarding the Prevention of Significant Deterioration Regulation (PSDR). Under the present PSDR, 40 CFR 52, National Parks and certain other federal lands are designated as Class II areas. Class II areas are defined as those in which air quality deterioration that would normally accompany moderate, well-planned growth would not be considered significant. The proposed legislation would have reclassified these areas to Class I. Class I applies to

those areas in which practically any change in air quality would be considered significant. It is likely that this legislation would be reintroduced in the 95th Congress.

D. APPLICANT'S PROPOSAL

1. Purpose and Need

According to UP&L and in hearings held on November 5 and 6, 1975 (Case 7140) by the State of Utah, Division of Public Utilities (Appendix I-7), the Emery generating complex is needed to meet projected (through 1980) electrical energy requirements in the UP&L market area (Figure 1-6). Detailed descriptive data on the UP&L proposal are available upon request at UP&L, 1407 W. North Temple, Salt Lake City, Utah.

By the winter of 1980, UP&L claims it will need approximately 2,968 MW of power (Figure 1-7) to meet requirements shown below:

	Megawatt
Firm Peak Load - This power is proposed for the customer load in the UP&L system.	1,890
Sierra Pacific - UP&L has a firm contract with this company to furnish power for normal needs of local customers.	200
Preference Customers - Municipal utilities that are preference customers of the Colorado River Storage Projects are Brigham City, Logan, Murray, Provo, Nephi, Springville, and Ogden Defense Depot.	59
Moon Lake Electric - Rural Electrical Association serves the Uinta Basin area.	52

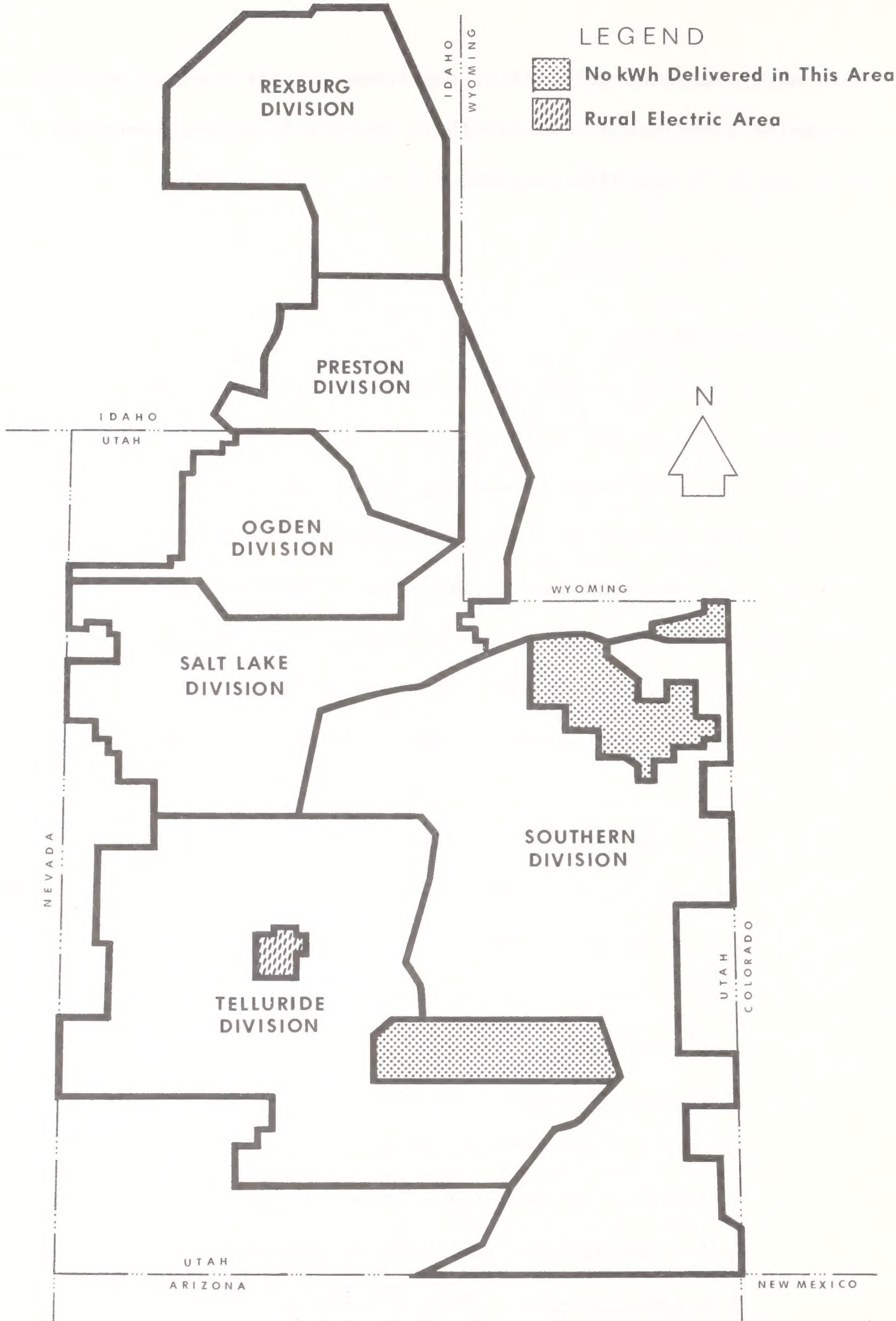


FIGURE 1-6

TERRITORY SERVED BY UTAH POWER AND LIGHT COMPANY

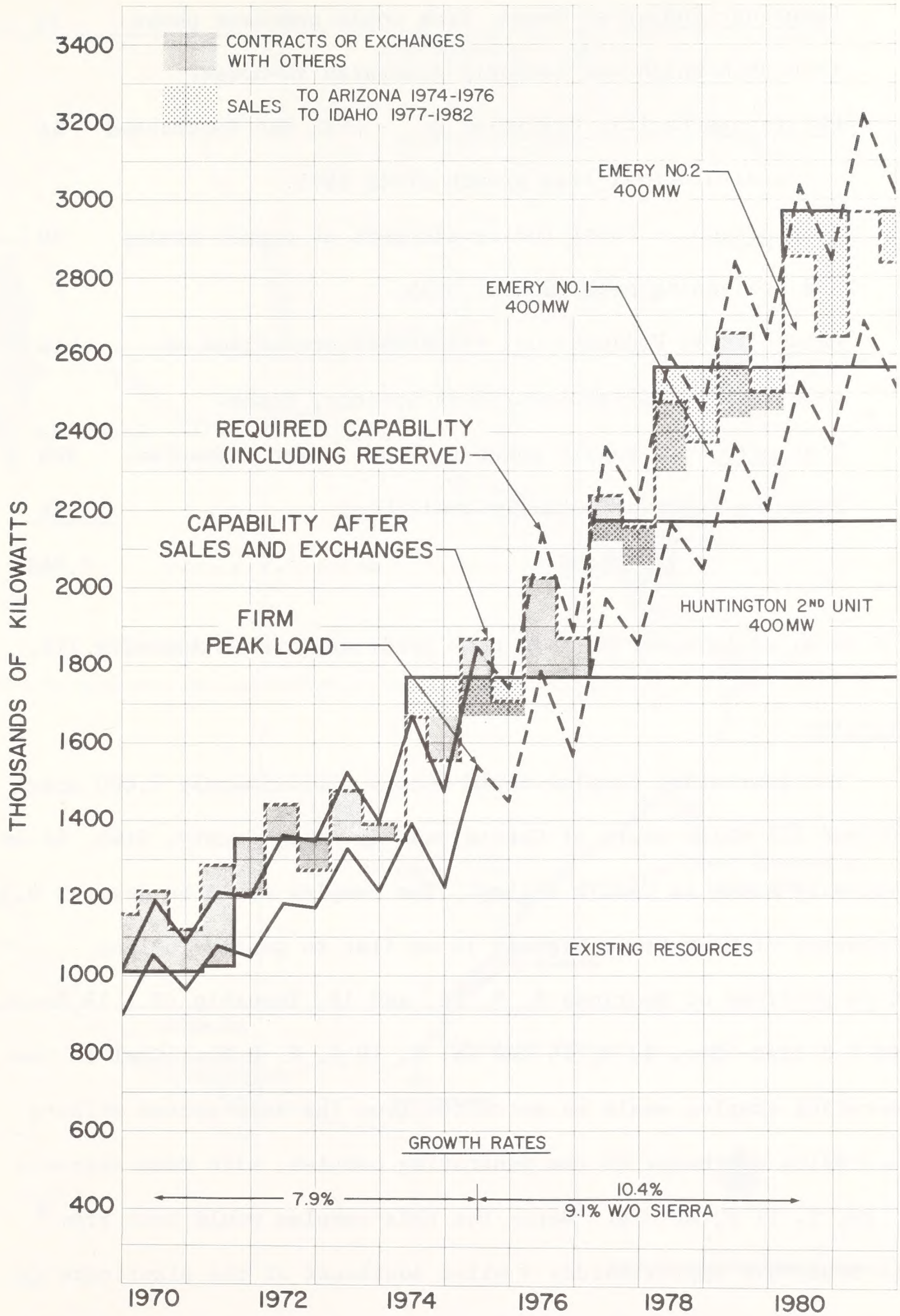


FIGURE 1-7

UP&L DEMAND CAPABILITY

Kennecott Copper at Magna, Utah would purchase power from UP&L which was formerly generated in-house.	59
California Pacific Utilities Co. - UP&L has contracted to furnish normal load growth after 1975.	46
Anaconda Co. - Power for development of copper mining and processing near Tooele, Utah.	50
Agricultural Products Co. - Increase production of phosphate fertilizer near Soda Springs, Idaho.	16
Contracts - to supply power to other power companies.	320
Spinning Reserve (actually available)	276
TOTAL NEEDS............................	2,968

Note: A detailed forecast of firm peak loads appears in Appendix III.

2. Location

The generating complex would occupy approximately 2,000 acres of UP&L land 2.5 miles south of Castle Dale in Emery County, Utah, in an area generally known as Castle Valley. The complex would be located 0.5 mile southeast of Utah State Highway 10 on flat to gently-rolling terrain in portions of Sections 8, 9, 16, and 18, Township (T.) 19 South, Range (R.) 8 East (Sec. 8, 9, 16 and 18, T. 19 S, R. 8 E). Coal to fuel the generating complex would be extracted from the underground Wilberg Mine 12.5 miles northwest of the generating complex, with mine entrance in Sec. 22, T. 17 S, R. 7 E. Water for this complex would come from Millsite Reservoir approximately 9 miles southwest of the plant site in Sec. 7, T. 20 S, R. 7 E. Figure 1-8 shows the location of the generating complex, coal mine, coal haul road route, reservoir, and water pipe line route.

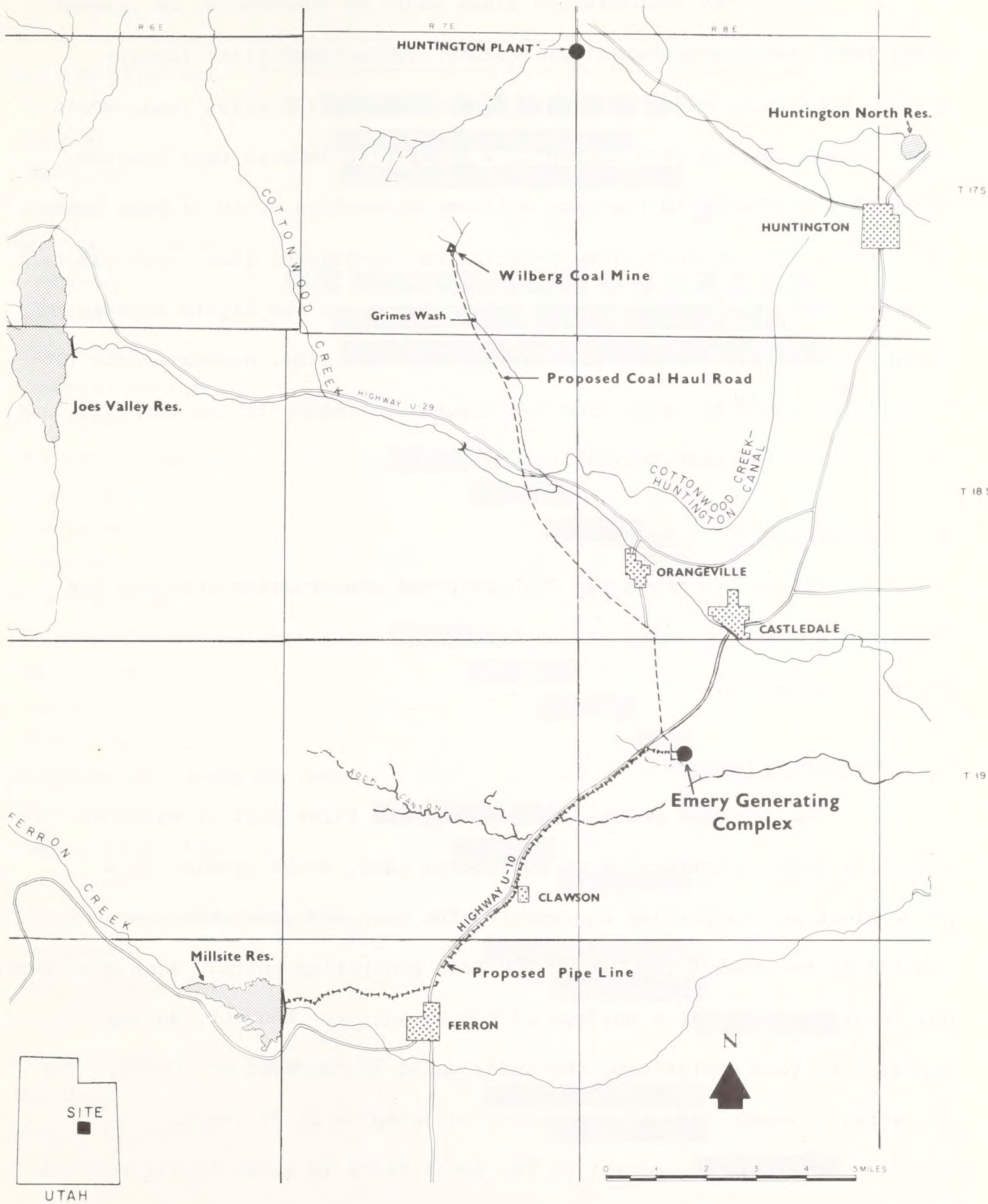


FIGURE 1-8

MINE, COAL HAUL ROAD, RESERVOIR, AND WATER PIPE LINE

Two 345-kV transmission lines would be constructed to transmit power from the Emery generating complex. The northern line (Emery-Spanish Fork Canyon-Camp Williams), approximately 118 miles long, would pass through Spanish Fork Canyon to a substation located near Spanish Fork, then northerly to the Camp Williams substation south of Salt Lake City, Utah. The southern (Emery-Salina Canyon-Sigurd) line, approximately 73 miles long, would pass through Salina Canyon to the Sigurd substation north of Richfield, Utah. In addition, a 345-kV line, approximately 118 miles long, would be built from the Sigurd substation to the Camp Williams substation to increase reliability.

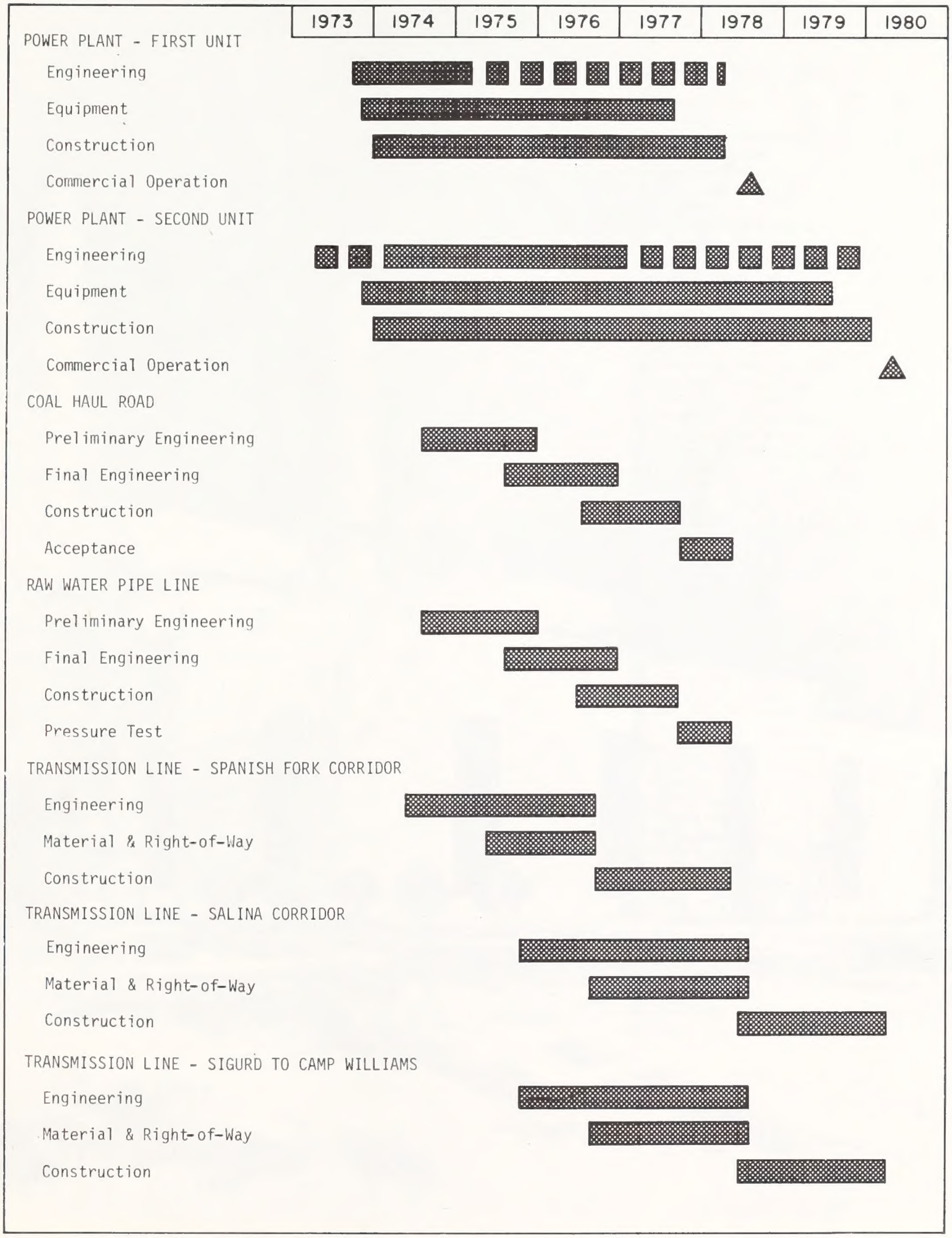
3. Implementation Schedule

Figure 1-9 shows the UP&L proposed construction schedule for the first and second units of the Emery generating complex and major project components.

4. Generating Complex

The proposed generating complex, the first part of which is presently under construction on nonfederal land, would consist of a power block and supporting equipment. The proposed power block would consist of two coal-fired, steam-electric generating units. Each generating unit would be rated at a maximum of 430 MW output. However, during normal full load operations, the units would be operated at 400 MW. The projected economic life of the generating complex is 35 years.

An artist's concept of the power block is shown in Figure 1-10. Figure 1-11 shows the civil plot plan for the entire generating complex. Major components of the proposed generating complex are: two induced-draft cooling towers; two smokestacks; electrostatic precipitators; ash



(Source: UP&L)

FIGURE 1-9

PROPOSED CONSTRUCTION SCHEDULE

FIGURE 1-10

ARTIST'S CONCEPT POWER BLOCK

LEGEND

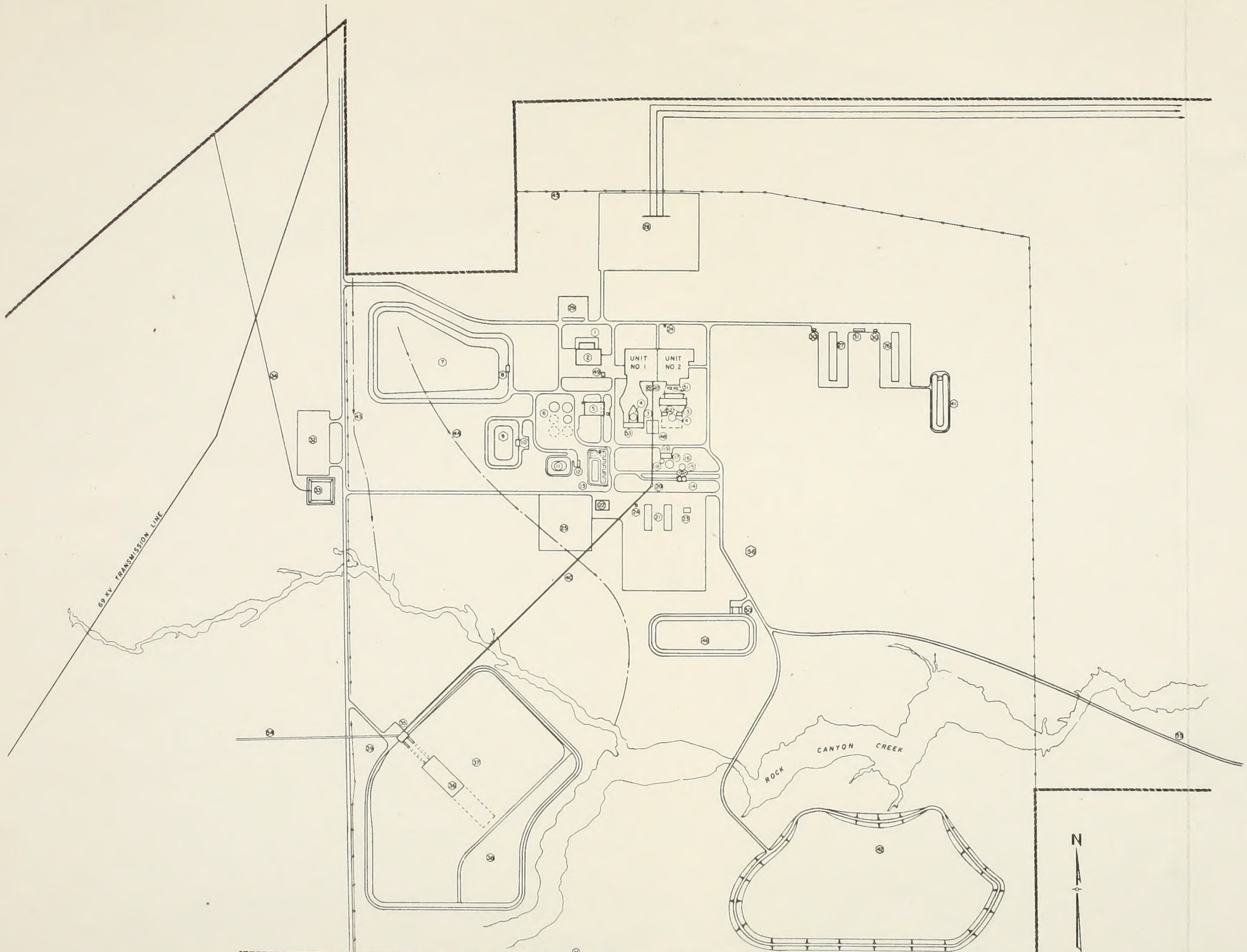
1. ADMINISTRATION BUILDING
2. WAREHOUSE
3. PRECIPITATOR
4. CHIMNEY
5. WATER TREATMENT BUILDING
6. LIME SOFTENERS
7. RAW WATER BASIN
8. RAW WATER PUMPHOUSE
9. CLEARWELL
10. CLEARWELL PUMPHOUSE
11. POLISHING POND
12. SEWAGE TREATMENT BUILDING
13. FUEL OIL STORAGE
14. FLY ASH SILOS
15. DEWATERING BINS
16. SETTLING TANK
17. SURGE TANK
18. ASH WATER STORAGE TANK
19. ASH WATER PUMPHOUSE
20. TRANSFER BUILDING
21. CONSTRUCTION WAREHOUSE
22. CONSTRUCTION OFFICE
23. VEHICLE MAINTENANCE BUILDING
24. SANITARY FACILITY
25. CONSTRUCTION PARKING
26. UNIT NO. 1 COOLING TOWER
27. UNIT NO. 2 COOLING TOWER
28. SWITCHYARD
29. ADMINISTRATION PARKING
30. COOLING TOWER CONTROL BUILDING
31. CHEMICAL TREATMENT BUILDING
32. BATCH PLANT
33. BATCH WATER POND
34. BATCH WATER POND SUPPLY PIPELINE
35. COAL RECEIVING BUILDING
36. COAL - LIVE STORAGE
37. COAL - DEAD STORAGE
38. COAL YARD EVAPORATION POND
39. OVERLAND COAL CONVEYOR
40. RECLAIM COAL CONVEYOR
41. CIRCULATING WATER HOLDING BASIN
42. EVAPORATION BASIN
43. DEWATERING PIPELINE NO. 1
44. DEWATERING PIPELINE NO. 2
45. PROPERTY FENCE
46. COOLING TOWER BLOWDOWN BASIN
47. CONDENSATE STORAGE TANKS
48. REMOTE SWITCHGEAR BUILDING
49. PAINT SHOP
50. COOLING TOWER BLOWDOWN SUMP STRUCTURE
51. F. D. FANS
52. I. D. FANS
53. SO_2 SCRUBBER - IF REQUIRED
54. COAL HAUL ROAD
55. HAUL ROAD TO SOLID WASTE DISPOSAL AREA
56. TRASH DISPOSAL

FIGURE 1-11

CIVIL PLOT PLAN FOR COMPLEX

FIGURE 1-10

ARTIST'S CONCEPT POWER BLOCK



LEGEND

1. ADMINISTRATION BUILDING
2. WAREHOUSE
3. PRECIPITATOR
4. CHIMNEY
5. WATER TREATMENT BUILDING
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55. HAUL ROAD TO SOLID WASTE DISPOSAL AREA
56. TRASH DISPOSAL

FIGURE 1-11

CIVIL PLOT PLAN FOR COMPLEX

handling system; fuel oil storage tanks; electric switchyard; associated office and maintenance buildings; water settling, holding, treatment and evaporation ponds; coal transport system; coal storage areas; and drain fields.

Figure 1-12 presents an operational diagram showing the material flow into and out of the generating complex.

a. Boilers and Generators

The building housing the boilers and generators would be 232 feet high, 272 feet wide, and 528 feet long (Figure 1-10). Boilers would be tangentially fired with a maximum combustion temperature of 2,600° Fahrenheit (F). Each boiler would be rated at 3,344,000 pounds of steam per hour at 2,400 pounds per square inch (lb/in^2) pressure and 1,000° F for both initial and reheat temperatures. The two boilers would consume about 2,400,000 tons of coal and produce about 248,000 tons of ash annually at a normal operating rate of 80 percent maximum output.

The turbine-generator would be rated at a net maximum output of 430 MW at 23,000 volts.

b. Cooling Towers

Initially, one wet, mechanical-draft, cross-flow cooling tower would be provided for operating the first unit. The wet cooling tower at Emery would resemble those at Huntington (Figure 1-13). Approximately 3,341 gallons of water per minute (5,390 acre-feet per year) would be needed to operate the first generating unit. See Figure 1-14 for a water budget for this unit.

During construction of the second generating unit at Emery, a second cooling tower would be built and dry cooling sections would be

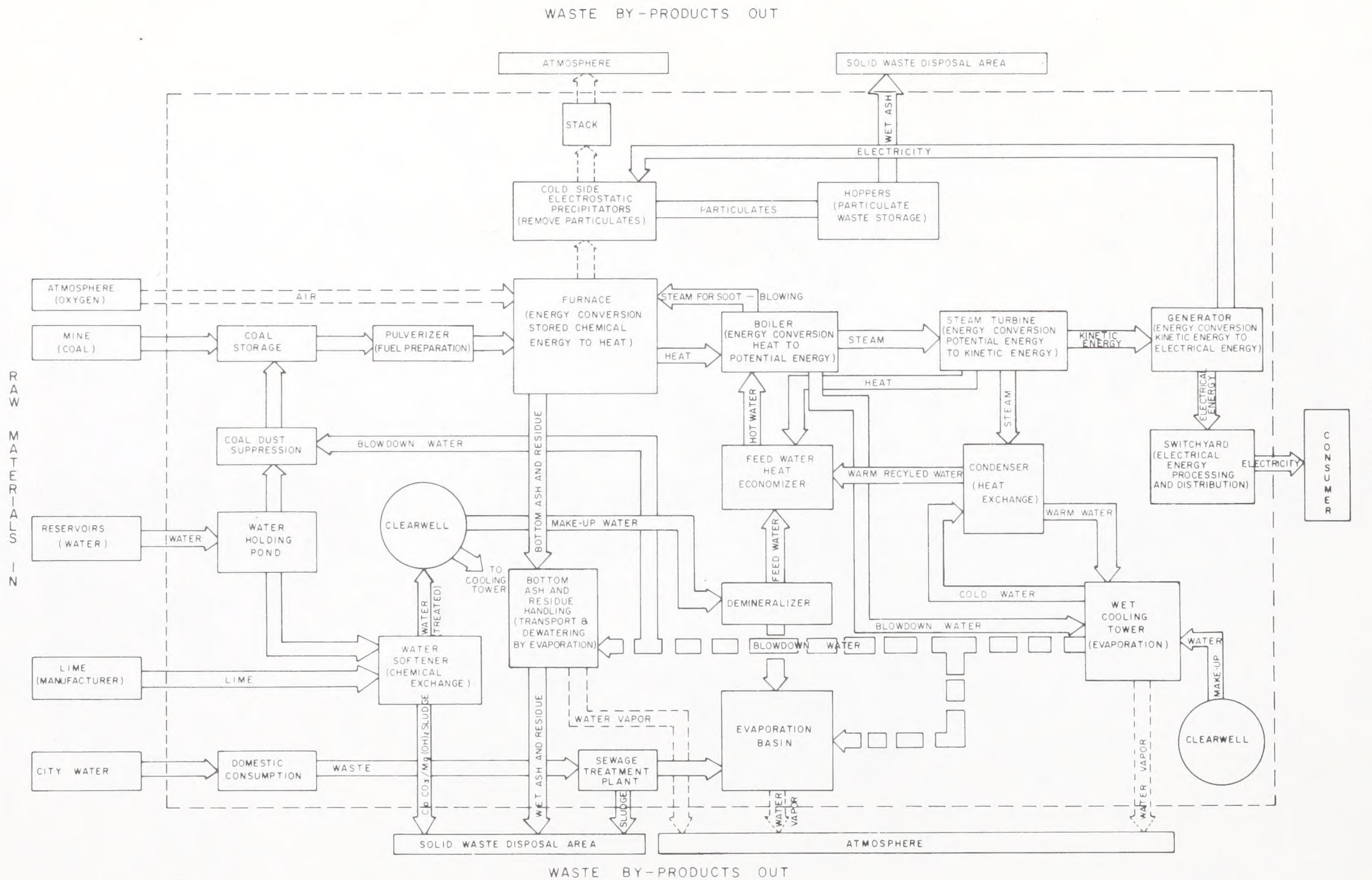


FIGURE 1-12

MATERIAL FLOW DIAGRAM

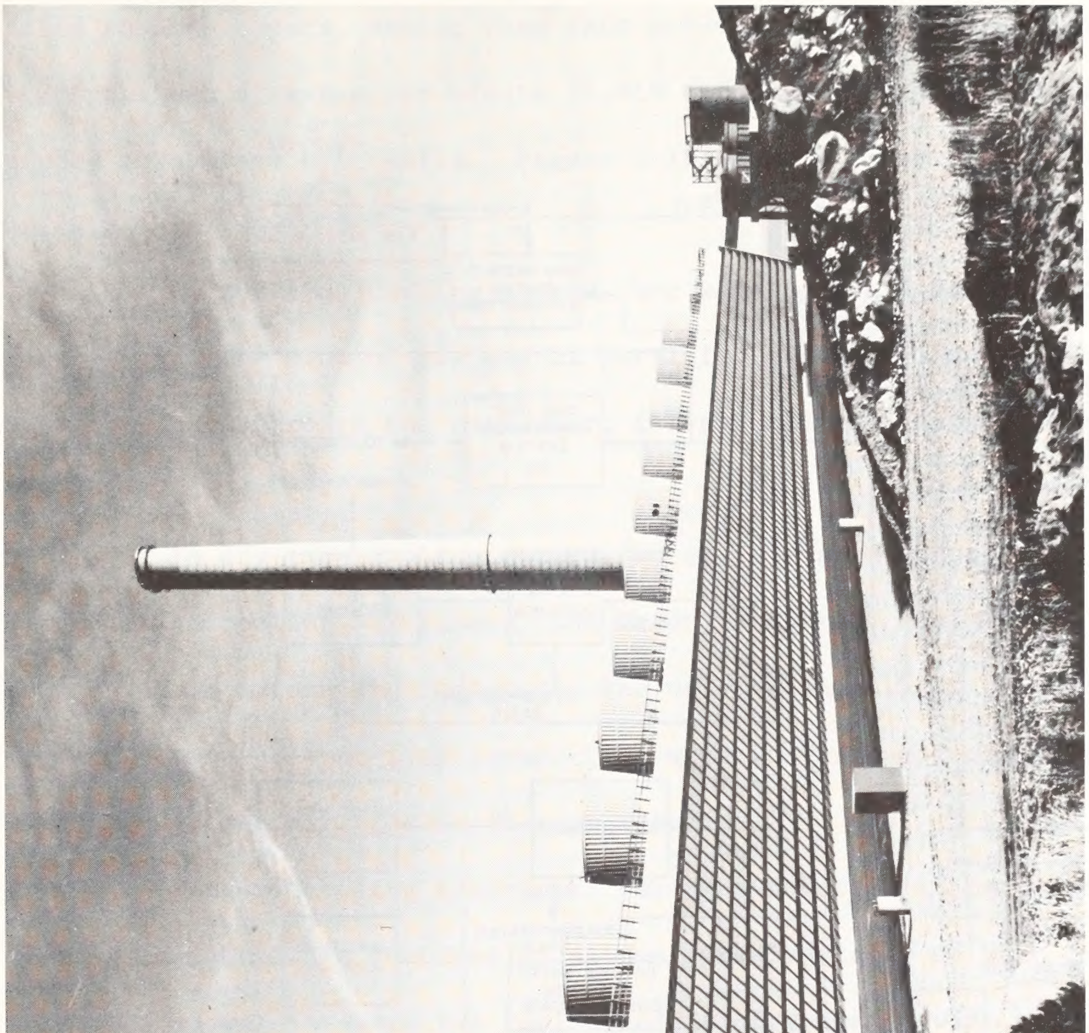
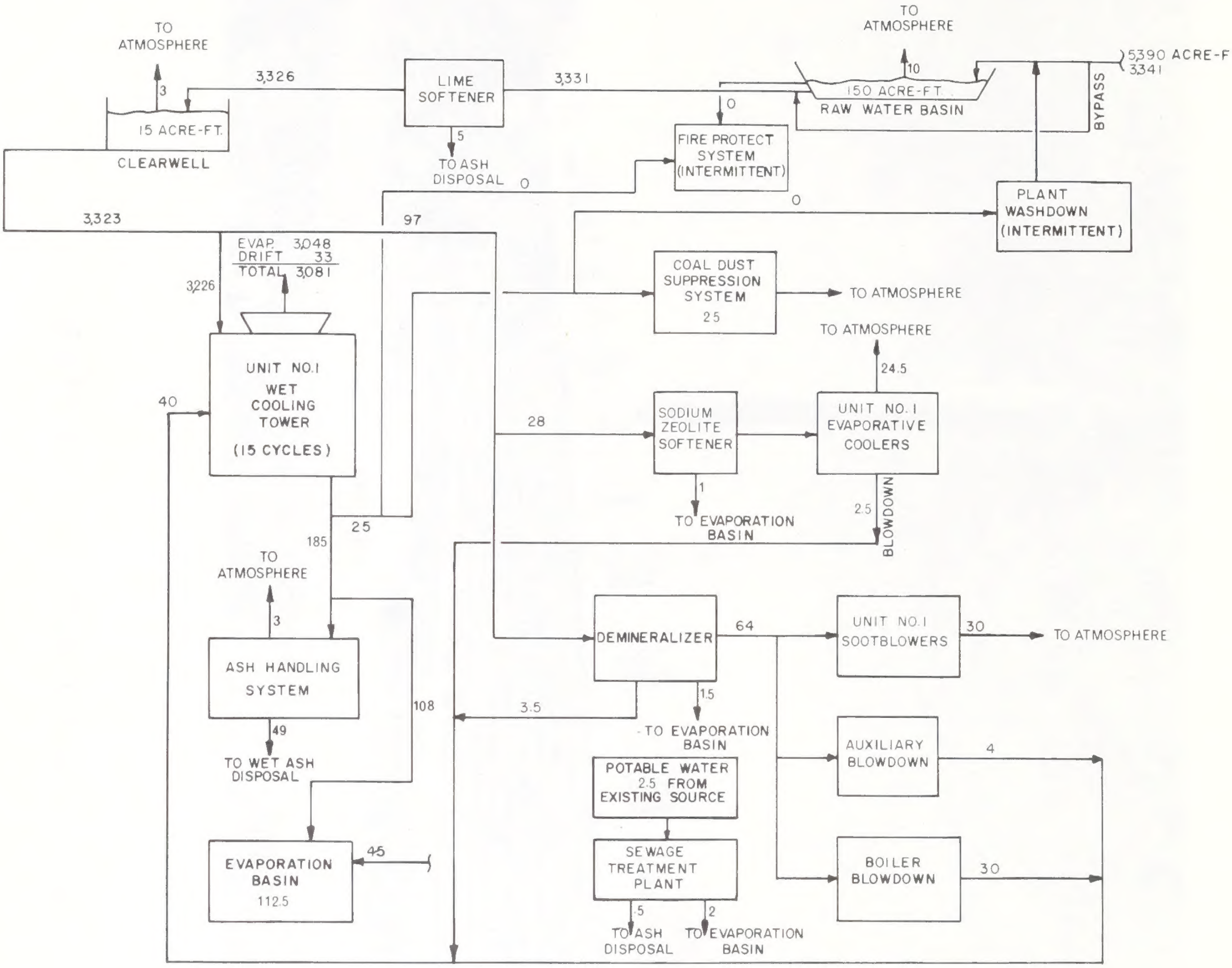


FIGURE 1-13

HUNTINGTON COOLING TOWERS



Note: Flow rates are in yearly averages and, unless otherwise noted, in gallons per minute (gal/min).

FIGURE 1-14

WATER BUDGET–EMERY UNIT NUMBER 1

added to both towers, making them into wet-dry cooling towers. Approximately 4,289 gallons of water per minute (6,918 acre-feet per year) would be needed to operate both units. Figure 1-15 shows a water budget for both units.

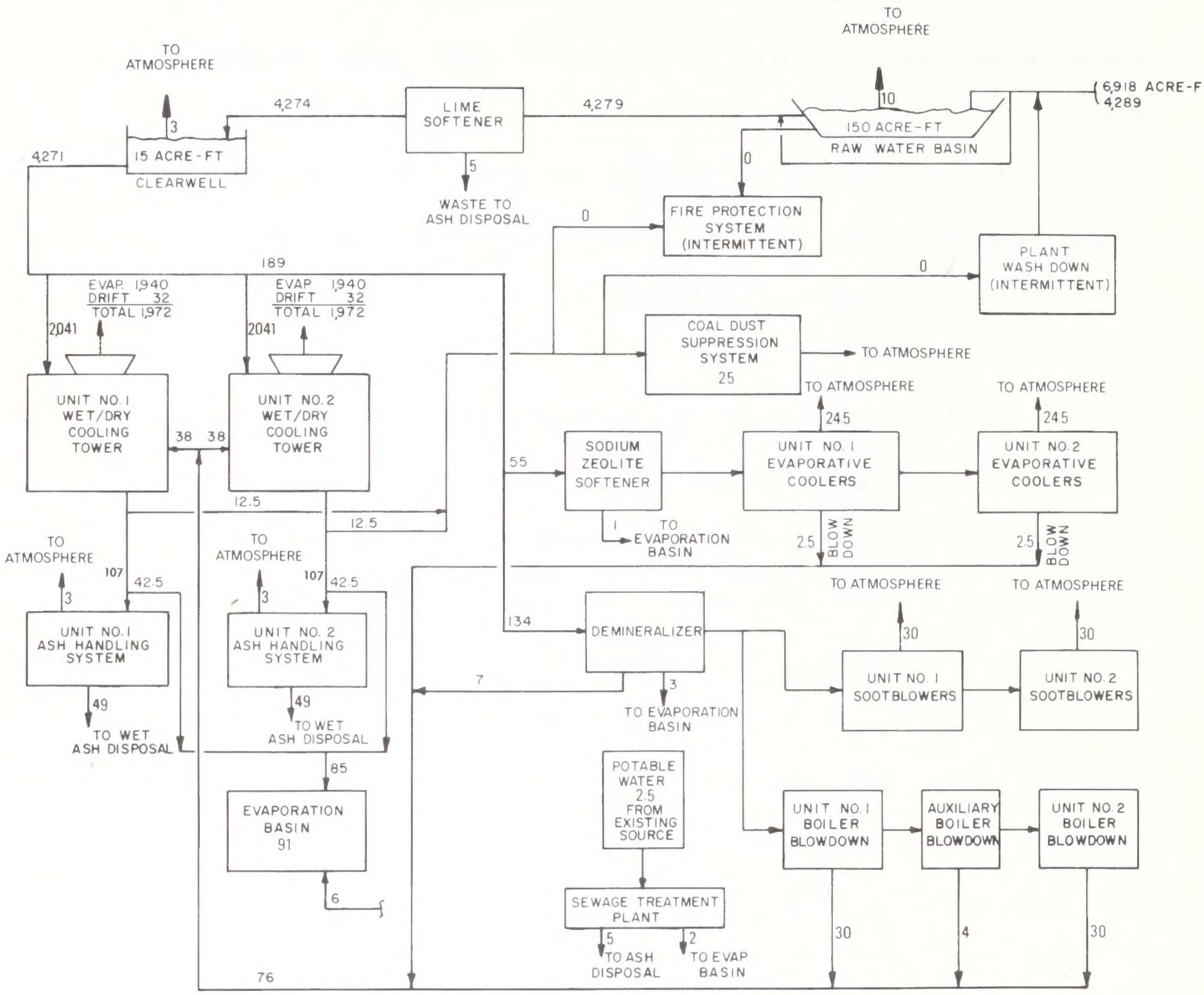
In wet-type cooling towers, hot water comes directly into contact with the flow of air and is partially evaporated and cooled. It then goes back through the condenser, is reheated, and pumped back to the tower.

In dry-type cooling towers, water is passed through pipes around which cooling air flows. The water is thereby cooled much the same as in an automobile radiator. The water then follows the same sequence as in the wet-type tower. The water never comes directly into contact with the air so none is evaporated.

Wet-dry cooling towers are wet-type towers with outer dry-type sections added. This combination allows for advantages of both types mentioned above - evaporative cooling efficiency during warm weather, and conservation of water in cool weather.

Most water loss (3,944 gallons per minute for both generating units) would be through evaporation, leaving behind most original impurities in the water. Present design calls for recycling the water until a concentration of the total dissolved solids would be 15 times that found in the original water. In addition, with both generating units operating, about 64 gallons per minute would be carried out of the cooling towers as drift (water mist with incorporated dissolved solids).

The water circulating within the cooling system would contain dissolved solids proportional to the original input water quality (but with some concentration depending upon the number of circulations).



Note: Flow rates are in yearly averages and, unless otherwise noted, in gallons per minute (gal/min).

FIGURE 1-15

WATER BUDGET—EMERY UNITS NUMBER 1 AND 2

Some water droplets containing dissolved solids would be entrained in the air stream and mechanically removed from the tower in the updraft flow of cooling air. The solids would then be dispersed and deposited some distance downwind from the tower.

c. Emission Control Equipment

Each generating unit would be equipped with a cold-side electrostatic precipitator designed to remove 99.5 percent of the fly ash by means of electrically charged plates. The ash would be collected into hoppers for disposal in an ash disposal area. Waste water from other plant operations would be used to sluice ash from the precipitator.

Unpainted, concrete smokestacks for each generating unit would be approximately 600 feet in height. Red strobe lights would be installed on the smokestacks to warn aircraft. A summary of estimated stack emissions based on the units operating at maximum sustained capacity is shown in Table 1-4.

d. Switchyard

The switchyard would contain switch gear for line and generator protection. The main transformer would increase generator output voltage from 23,000 volts to 345,000 volts for transmission over the main lines.

The switchyard would occupy about 23 acres. The tallest poles would be 100 feet in height, coated to blend with the environment. The yard would be designed and equipped similarly to the switchyard at the Huntington generating complex (Figure 1-16).

e. Administration Building, Parking Lot, Other Buildings

The two generating units would be housed in one building. Seven-

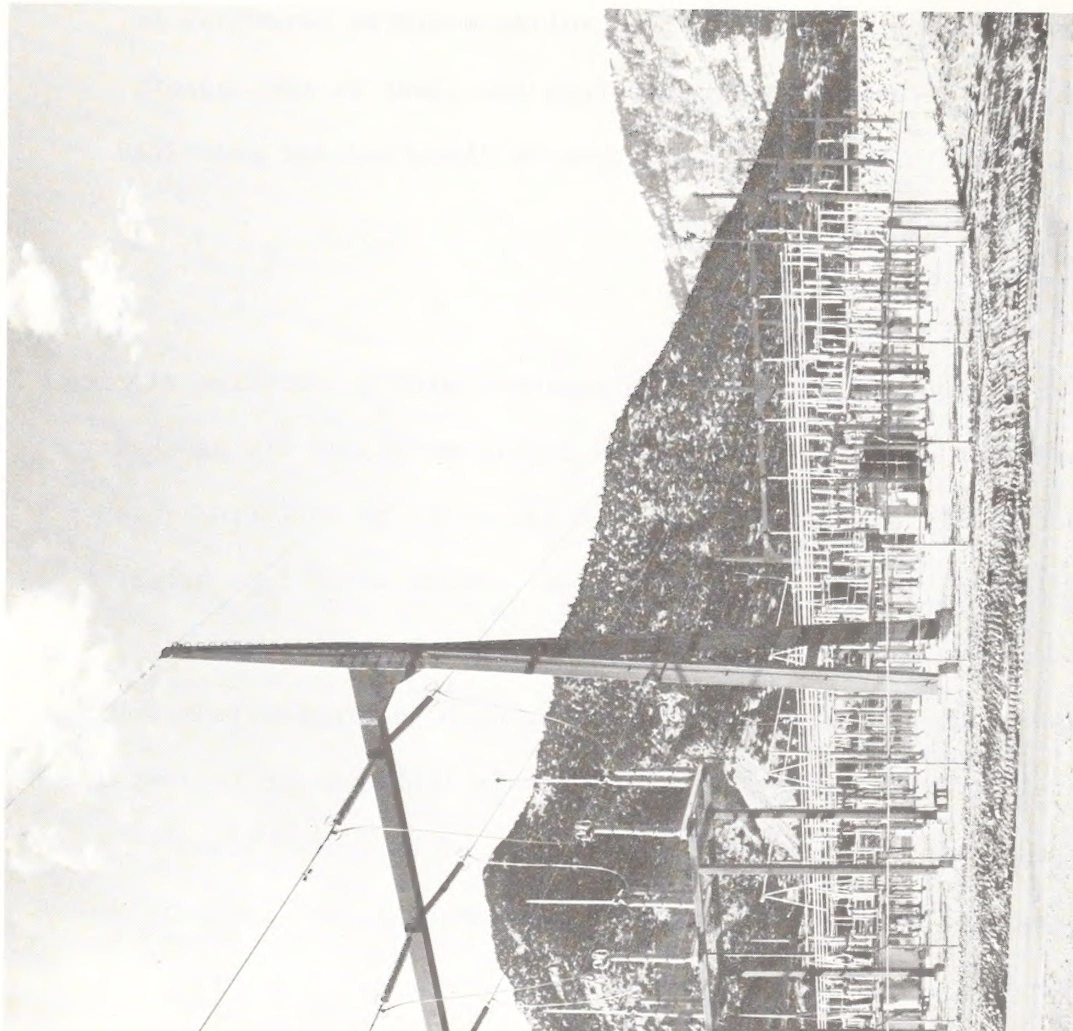


FIGURE 1-16

HUNTINGTON SWITCHYARD

teen other buildings would be located on the site (see Table 1-5).

The administration building would be constructed of light-colored brick. Other buildings would be of tan structural steel. The administration parking area would be paved. Total area occupied by buildings and parking lots would be about 10 acres.

TABLE 1-4

Estimated Stack Emissions

Constituent	Volume (p/m)	Weight (ton/d)
CO_2 (carbon dioxide)	136,100	20,374
H_2O (water)	67,250	4,120
N_2 (molecular nitrogen)	754,600	71,890
O_2 (molecular oxygen)	41,150	4,478
SO_x (oxides of sulfur) as SO_2	415	92
NO_x (oxides of nitrogen) as NO_2	450	70
Ash (with 99.5 percent efficient electrostatic precipitator)	-------	5.29

Note: Anticipated flue gas analysis is based on two boilers, 830 MW output at maximum sustained operating capacity, coal firing rate of 272 tons per hour, or 6,530 tons per day, flue gas flow of 2,200,000 standard cubic feet per minute, Hiawatha coal, (worst-grade) only. Emissions for SO_2 are based on having no SO_2 control.

f. Ponds

Six lined ponds would be constructed at the generating complex site. Their purposes, sizes, and general construction details are given in Table 1-6. The total surface area of the six ponds would be about 61.5 acres. Dikes would be of native materials.

TABLE 1-5

Buildings and Parking Areas on Emery Generating Complex

Legend[a]	Name	Length (ft)	Width (ft)	Height (ft)
1	Administration building	125	55	14
2	Warehouse	203	128	34
5	Water treatment building	120	90	41
8	Raw water pumphouse	80	33	15
10	Clearwell pumphouse	50	30	15
12	Sewage treatment building	60	25	9
19	Ash water pumphouse	93	45	21
20	Coal transfer building	36	36	86
21	Construction warehouse	200	60	20
22	Construction office	120	80	16
23	Vehicle maintenance building	50	40	25
30	Cooling tower control buildings (2)	41	27	13
31	Chemical treatment building	91	25	17
35	Coal receiving building	83	50	102
48	Remote switchgear building	103	92	18
49	Paint shop	38	26	13
25	Construction parking	425	400	---
29	Administration parking	250	175	---

[a]Legend refers to Legend on Civil Plot Plan for Complex, Figure 1-11.

TABLE 1-6

Ponds at Generating Complex Site

Pond	Description					
	Size (acre)	Capacity (acre-ft)	Lining	Dike Height (ft)	Purpose	Dike Material (yd^3)
Raw Water Storage Basin	11.0	150	Polyethylene Membrane	20	To store raw water from Millsite Reservoir pipe line	150,000 taken from pond area
Holding Pond	5.0	60	Impervious Clays	10	Surge ponds holding in-plant water for reuse	40,000 taken from pond area
Evaporation Basin	37.0	400	Impervious Clays	8	To hold water until evaporation	350,000 taken from pond area
Coal Yard Evaporation Pond	7.0	20	Sealed, type unspecified	4	To hold runoff from coal pile until evaporation	5,000 taken from pond area
Clear Well	1.4	14	Concrete	Flush w/ground	To hold treated water prior to use	Concrete tank
Polishing Pond	0.15	0.53	Impervious Clays	Flush w/ground	To hold effluent from sewage treatment plant prior to use as makeup water	1,000 taken from pond area

Source: UP&L

g. Coal Storage Area

Upon delivery at the receiving building, the coal would be dumped into a hopper and conveyed by belt to the coal storage area (Figure 1-11, Item 35). The live storage area would contain 65,280 tons of coal, enough for 10 days normal use. The 979,200 tons of coal in dead storage would be enough for 150 days normal use in case of machinery breakdown, mine disaster, or coal miners strike. Dead storage coal would be tightly compacted to control spontaneous combustion and piles would not be covered. Coal in live storage would be covered in a manner similar to that at the Huntington generating complex (Figure 1-17).

Water runoff from coal storage areas would drain to the coal yard evaporation pond (Figure 1-11, Item 38).

FIGURE 1-17

HUNTINGTON COAL STORAGE AREA

h. Plant Site Coal Conveyor

A 3,200-foot conveyor would be built at the plant site to carry coal from the coal storage area to the power block. This elevated, covered, belt conveyor would consist of two sections: a horizontal section from the storage yard to the transfer house, and an inclined section from the transfer house to bins located between units 1 and 2. The proposed conveyor location is shown in Figure 1-11, Item 40.

The conveyor would be covered with corrugated and sheet steel siding colored to blend with the landscape. The appearance would be similar to the Huntington generating complex conveyors (Figure 1-18).

i. Fence and Landscape

The entire generating complex site would be surrounded by a 6 foot high, unpainted, galvanized, chain link fence 21,000 feet long. The fence, fully grounded, would be similar to the one at the Huntington switchyard (Figure 1-19).

Landscape plantings would consist of native tree masses with limited lawn and shrubbery.

j. Communication System

A new microwave station would be required at the generating plant complex to tie into the UP&L master control communications network. The new microwave station would be in the plant switchyard at about latitude (lat.) 39° 10' 25" north and longitude (long.) 111° 01' 29" west. The associated self-supporting steel microwave tower would be about 90 feet high and carry one 6-foot dish antenna near the top.

The Emery generating complex microwave station would tie in with the existing microwave station on Cedar Mountain (lat. 39° 22' 40"

FIGURE 1-18

HUNTINGTON COMPLEX COAL CONVEYOR

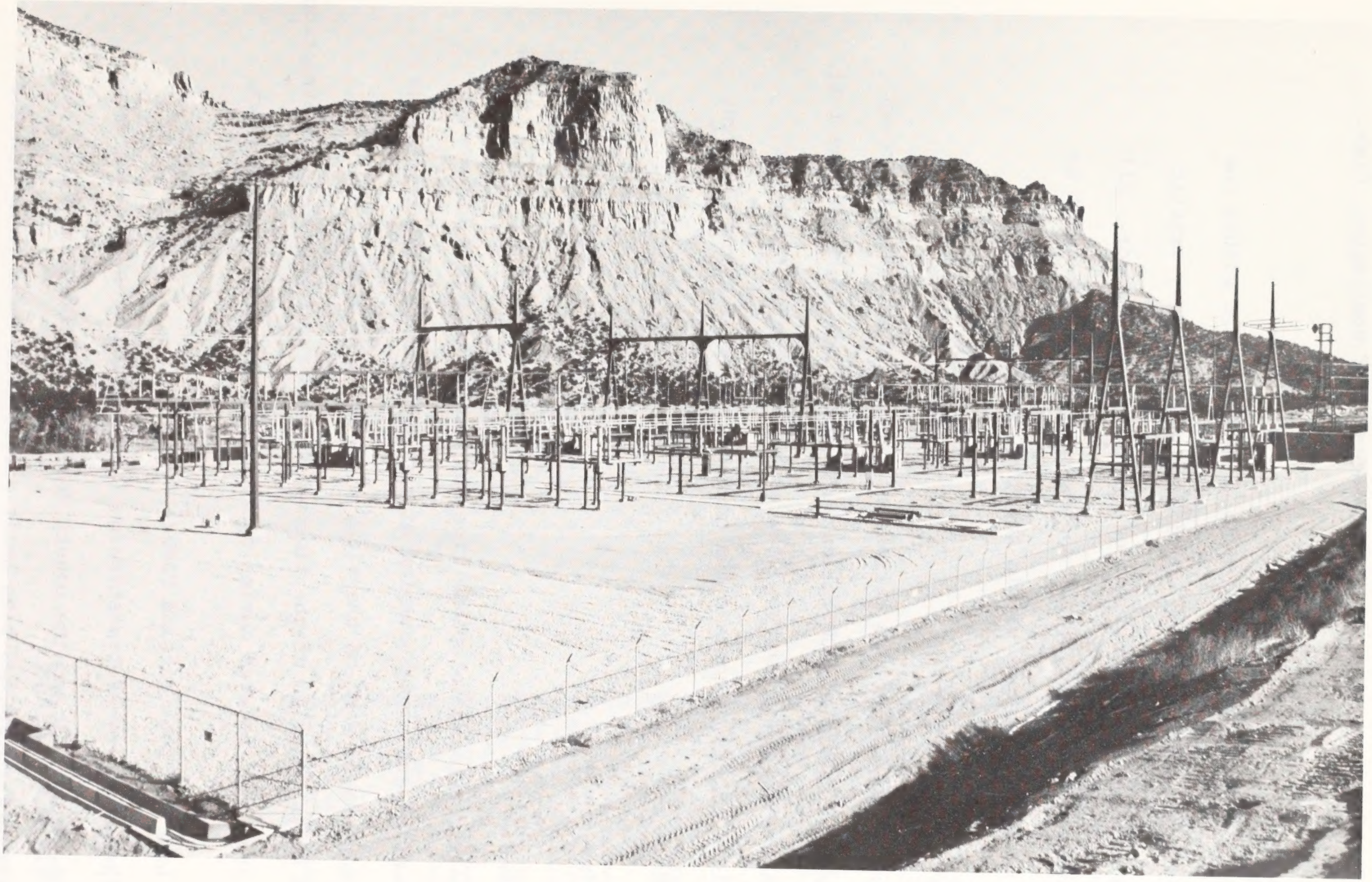


FIGURE 1-19

HUNTINGTON SWITCHYARD AND FENCE

N, long. 111° 04' 47" W) about 21 miles southeast of Huntington, Utah.

k. Service Roads

About 5 miles of service roads would be needed within the generating complex, half of which would be paved for heavy traffic volume. The remainder would be dirt or gravel surfaced roads. All roads would be about 30 feet wide. Approximately 18 acres would be permanently occupied by roads within the complex.

l. Fuel Oil

Approximately 210,000 gallons of fuel oil for boiler start-up would be stored in three 70,000 gallon surface storage tanks (Figure 1-11, Item 13). A lined catch basin would be constructed below the tanks with sufficient volume to contain the contents of one tank in the event of leakage or rupture.

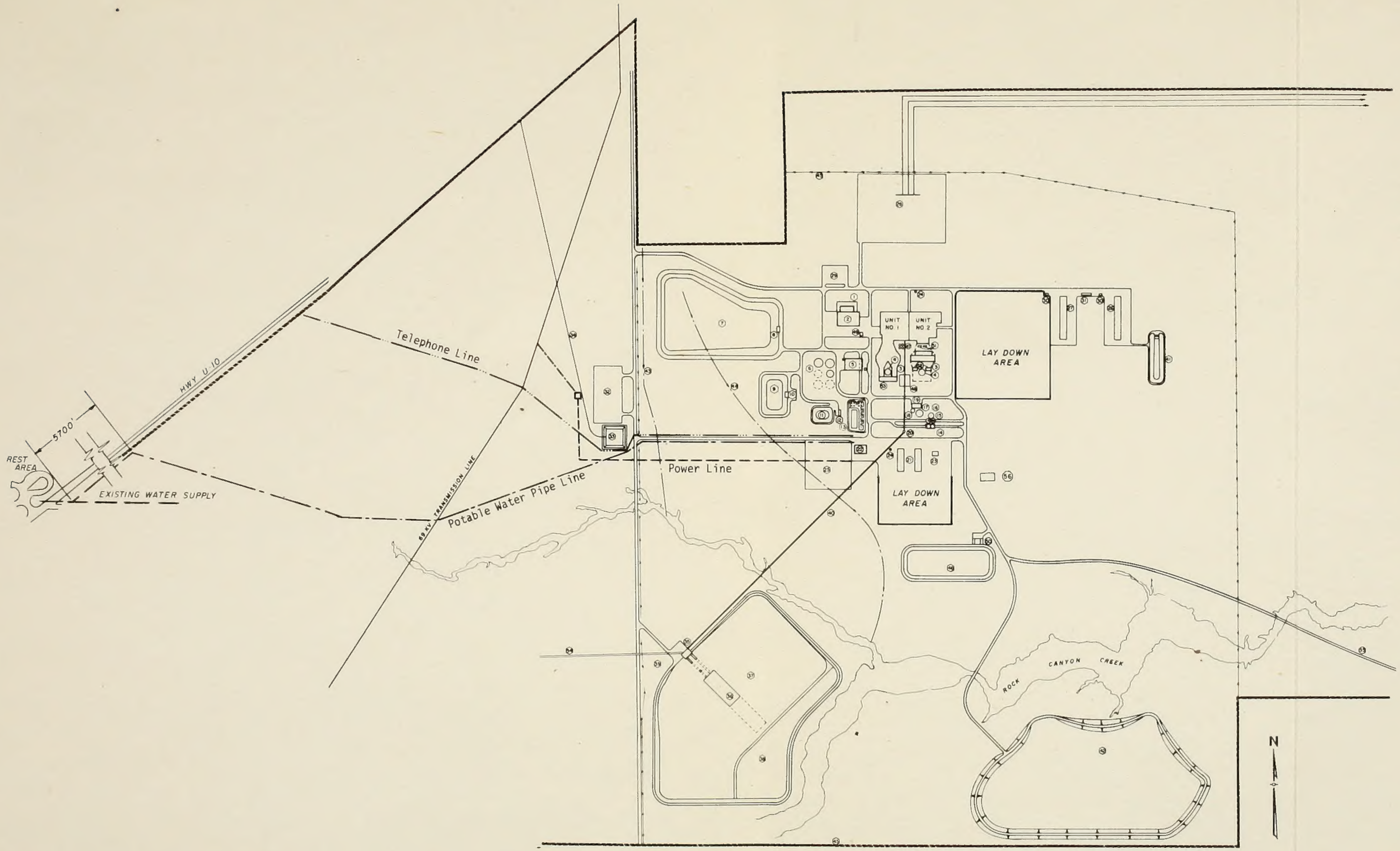
m. Utilities

(1) Telephone

An underground telephone line has been laid across UP&L-owned land to the plant generating complex site from the commercial trunk line along Utah Highway 10 west of the site, a distance of about 1 mile. Figure 1-20 shows location of the line which is servicing current construction activities and would be used during operation of the generating complex.

(2) Power Line for Construction Power

There is a 69-kV transmission line passing roughly north-south between Utah Highway 10 and the county road west of the plant site. A 0.25 mile temporary line has been built across UP&L-owned land from the



LEGEND

1. ADMINISTRATION BUILDING
2. WAREHOUSE
3. PRECIPITATOR
4. CHIMNEY
5. WATER TREATMENT BUILDING
6. LIME SOFTENERS
7. RAW WATER BASIN
8. RAW WATER PUMPHOUSE
9. CLEARWELL
10. CLEARWELL PUMPHOUSE
11. POLISHING POND
12. SEWAGE TREATMENT BUILDING
13. FUEL OIL STORAGE
14. FLY ASH SILOS
15. DEWATERING BINS
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53. SO_2 SCRUBBER - IF REQUIRED
54. COAL HAUL ROAD
55. HAUL ROAD TO SOLID WASTE DISPOSAL AREA
56. TRASH DISPOSAL

FIGURE 1-20

EMERY GENERATING COMPLEX UTILITIES

existing transmission line to a construction substation located west of the county road (Figure 1-20). This line is serving current construction activities and would be removed after construction of the second unit.

(3) Domestic Water

Potable water is being supplied from the Clawson water system. This system has been tapped at a rest stop along Highway U-10 located 3 miles southwest of the plant site. A 3-inch polyvinyl chloride water line has been constructed across private land from the rest stop to the plant complex (Figure 1-20).

Potable water use at the generating station after construction is expected to be about 3,600 gallons per day, or about 4 acre-feet per year.

n. Drain Fields

Two drain fields have been constructed and four others have been proposed for draining ground water at the generating complex site. The fields are shown in Figure 1-11.

Two drain fields with discharges (numbers 43 and 44, Figure 1-20) have been built and are being used to drain the construction area. About 7,350 feet of drain pipe have been laid. In order to complete the task of lowering ground water, four other lines totaling 10,150 feet would be constructed in the coal storage and evaporation pond area.

The drain pipe has been laid at an average depth of 16 feet. A trench was dug with a backhoe to a width of about 30 feet, and 6-inch drain tile were laid on a gravel bedding about 1 foot deep. The trench was then backfilled using a crawler tractor and compacted using a sheeps-foot roller.

About 10 acres have been disturbed by construction of the drain field; another 13 acres would be disturbed during construction of the remaining drain fields. The two existing drain fields are discharging ground water at a rate of about 80,000 gallons per day (gal/day) (90 acre-feet per year). The quality of the water discharged is poor, averaging approximately 9,000 parts per million (p/m) total dissolved solids.

5. <u>Coal Source</u>

a. Requirements

The two units at the Emery generating station would use a predicted maximum of 84,000,000 tons of coal during the projected 35-year economic plant life. Table 1-7 shows the estimated coal consumption.

TABLE 1-7

Estimated Coal Consumption

Coal Requirements	One Unit	Two Units
At Maximum Production (100% operating rate)	170 tons per hour	340 tons per hour
At 80% of Maximum (long term maximum operating rate)	136 tons per hour	272 tons per hour
Annual Long Term Maximum Consumption	1,200,000 tons	2,400,000 tons
Estimated Annual Consumption Range	800,000 to 1,200,000 tons	1,600,000 to 2,400,000 tons

b. Wilberg Mine

The Wilberg Mine, idle for several years, is a room-and-pillar mine (Figure 1-21), located in the Grimes Wash area 13 miles northwest

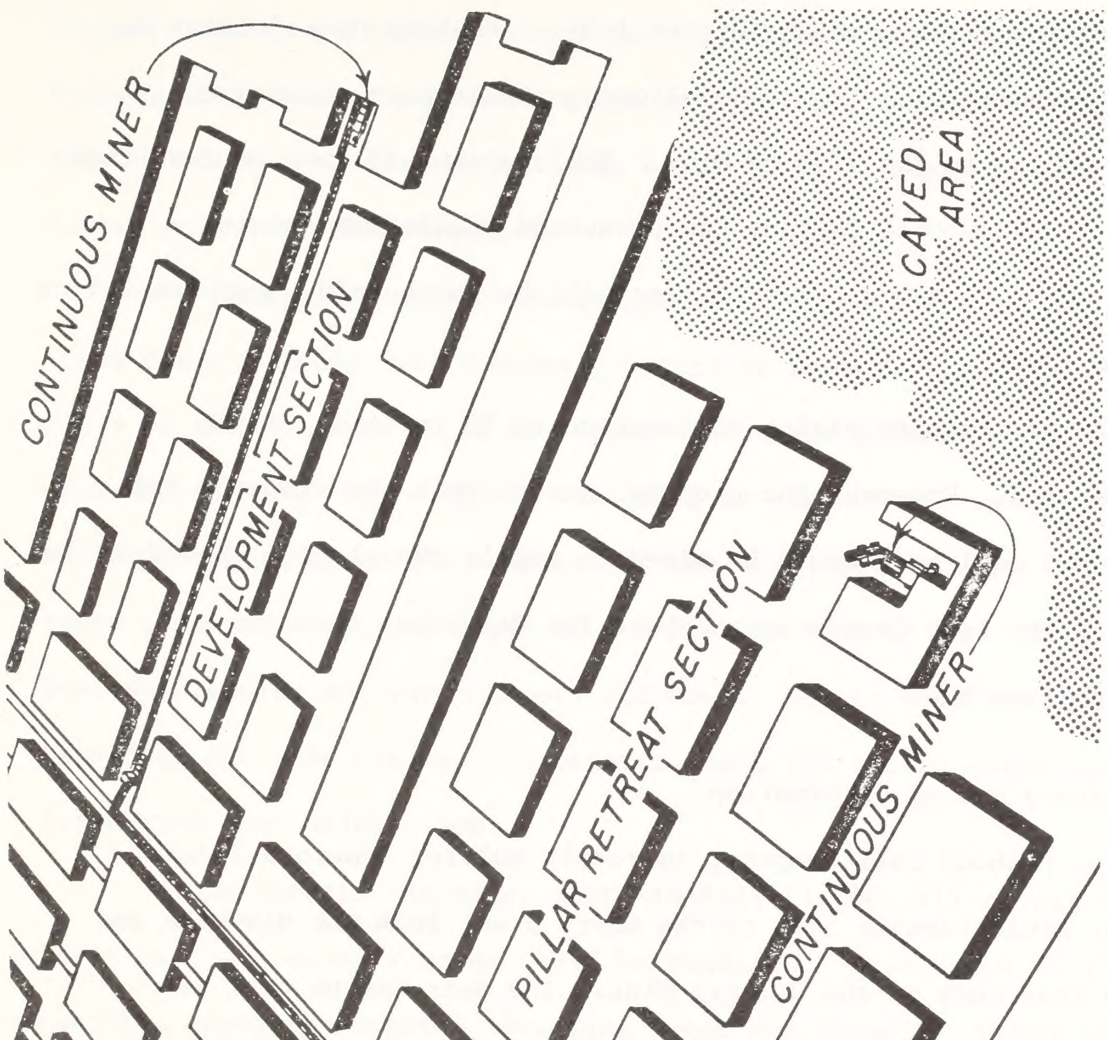


FIGURE 1-21

A ROOM AND PILLAR MINE

of the generating plant complex (Figure 1-8). Peabody Coal Company has a letter of authorization from USGS allowing the Company to conduct exploratory mining in the Wilberg Mine. Exploration will not be completed until 1978. Peabody Coal Company has presented preliminary mining information to USGS, and a detailed plan will be forthcoming upon completion of exploratory work.

The preliminary mining information is in relation to the Hiawatha coal bed. However, the proposal states both the Hiawatha and the Bear Canyon coal beds would be mined to supply the plant. The USGS would require the Bear Canyon seam (above the Hiawatha) to be mined prior to the Hiawatha.

(1) Preliminary Mining Information

The Peabody Coal Company, currently holding numerous federal coal leases, would furnish coal to the Emery plant from the Hiawatha and Bear Canyon coal beds in the Wilberg Mine. The Bear Canyon coal bed lies 120 to 140 feet above the Hiawatha bed. It is proposed that both seams would be worked from the Wilberg Mine. Pillars would be superimposed vertically. Peabody estimates approximately 50 percent of the coal from the Wilberg Mine would be recovered.

According to USGS and Peabody, there is sufficient coal in the area of the Wilberg Mine to provide the 84 million tons (maximum consumption) for the 35-year life span of the plant.

All mining at the Wilberg Mine would be done with a "continuous miner" under guidelines of the Mining Enforcement and Safety Administration (MESA). The "continuous miner" rips coal loose from the face of the solid deposit using mechanical cutters, then loads the broken material

directly onto a portable conveyor belt or shuttle car (Figure 1-21). Peabody Coal Company proposes to use roof bolts for necessary roof support after coal is removed. The bolts would be supplemented by timber supports where required.

Based upon current water production from the adjacent Deer Creek Mine, Peabody Coal Company projects as much as 400,000 gallons daily of excess water could be produced from the Wilberg Mine. A 6-inch diameter plastic pipe would be installed to conduct the excess mine water from Wilberg to the entrance of the abandoned Anderson Mine. From there the water would be piped to the Deseret Mine to be utilized in dust suppression and for culinary purposes. Should some emergency occur regarding the pipe line or the Deseret Mine, the excess water would be discharged down Grimes Wash.

To operate the mine, approximately 14,000 gallons per day (16 acre-feet) of culinary water would be required. This water would be used for sanitary purposes, drinking water and showers. Water from within the mine would be stored in a 60,000 gallon tank located in the old works. This storage tank would provide a final settling stage for clarifying the fresh water. The tank would be fitted with a clean-out sump for removal of settled solids. From the storage tank, water would pass through a pressurized filter, a softener, and a chlorinator before going to the cold water storage and hot water heater tanks. Waste culinary water would be carried by pipe line to a septic tank. From there the water would pass through a 6-inch pipe line to a leach field (3.0 acres) 1.1 miles down Grimes Wash (Area D, Figure 1-22).

Operation of the mine would require approximately 51,000 gallons of water per day (57 acre-feet) to be used principally for dust

suppression. The source of this water would also be within the mine itself.

The current exploratory work force of 70 men would be expanded to 600 men in 1980. Table 1-8 lists the proposed manpower buildup. Coal production would increase from 300,000 tons in 1975 to 500,000 tons in 1976, reaching 1,000,000 tons in 1978 and 1979. Full production of 2,400,000 tons annually could be reached by 1980, and continue at that rate for the life of the mine.

(2) Coal Analysis

Based on the latest analysis, the coal in the Wilberg Mine is Late Cretaceous coal of the Blackhawk Formation (Hiawatha and Bear Canyon beds) containing an average of 10.10 percent ash and 0.54 percent sulfur (Table 6, Appendix IV-1). Appendix IV-1 gives a detailed rationale for determining worst-grade coal from the Wilberg Mine. An analysis for trace elements has not been made on coal from the Wilberg Mine. However, trace analyses are available for samples taken from the nearby Deseret Mine and other mines in the Hiawatha seam (Appendix IV-2) which are inferred to be comparable to results expected from Wilberg Mine coal. There are no plans to perform separate trace element analyses on Wilberg Mine coal.

(3) Mine Mouth Facilities

The Wilberg Mine site would include four distinct surface areas in and near Grimes Wash, as shown in Figure 1-22. The mine mouth area (Area A) consists of 20 acres in the immediate vicinity of the portal. Because of rugged terrain and limited building space, the administration area, warehouse, and shower houses are being constructed underground, inside the mine mouth. Also, this area would contain a

TABLE 1-8

Forecast Manpower Requirements
Emery County Area - 1975 Through 1980

Year/ Quarter	Number of Personnel Required						Total
	Construction Labor			Operating Labor	Miners		
	Unit No 1	Unit No 2	Sub Total	Units 1 & 2	Mine Development[a]	Mine Operation	
1975 -1	100		100		(20)		100
-2	120		120		(20)		120
-3	142		142		(20)		142
-4	160		160		(50)		160
1976 -1	210		210		(70)		210
-2	355		355		(100)		355
-3	450		450		(100)		450
-4	575		575		(170		575
1977 -1	660	100	760	0	(180)		760
-2	900	120	1,020	0	(180)		1,020
-3	900	142	1,042	10	(180)		1,052
-4	480	160	640	101		260	1,001
1978 -1	345	210	555	130		260	945
-2	200	305	505	130		260	895
-3	30	400	430	130		260	820
-4		475	475	130		260	865
1979 -1		560	560	130		260	950
-2		700	700	130		260	1,090
-3		700	700	140		330	1,170
-4		330	330	187		500	1,017
1980 -1		345	345	203		500	1048
-2		200	200	203		600	1003
-3		30	30	203		600	833
-4			0	203		600	803

Source: Compiled from information supplied by Utah Power and Light Company and Peabody Coal Company.

[a]Mine development labor for exploratory operations are not included in total.

parking lot for 200 cars, general mine storage, material tramway, man lift, and a repair shop. There are five openings into the mine, plus four openings into the underground bathhouse-office complex.

A 78-inch culvert has been placed in the left fork of Grimes Wash and covered with 10 feet of fill in order to enlarge the storage area (Figure 1-22). Prior to construction of the mine-storage yard area, another 78-inch culvert would be laid in the east fork of Grimes Wash, connecting with an existing culvert in the west fork and extending southward through a 109-inch culvert with the lower end open to Grimes Wash. These culverts would be 78 inches in diameter and would handle the maximum anticipated rainfall. The culverts would help prevent coal dust from the portal area from entering runoff flowing down Grimes Wash. A pile of boulders would be placed at the downstream end of the culvert to dissipate the force of flood waters passing through the culvert.

The coal handling system at the mine would consist of a conveyor belt exiting the portal and discharging at the top of a concrete silo. There would be a discharge at the bottom of the silo to an elevated conveyor belt that would carry the coal to the storage area.

The conveyor belt (Figure 1-22) would extend about 1.5 miles down Grimes Wash to a 25,000-ton live stockpile. The conveyor would require a 100-foot right-of-way. An area of about 18 acres would be occupied by the conveyor.

The conveyor would be an elevated, covered structure. The cover over the conveyor would be designed to avoid losses due to blowing coal dust and to control air pollution. No additional access road would be required parallel to the conveyor belt. Construction of the support towers would be conducted at the same time as the surfacing of the

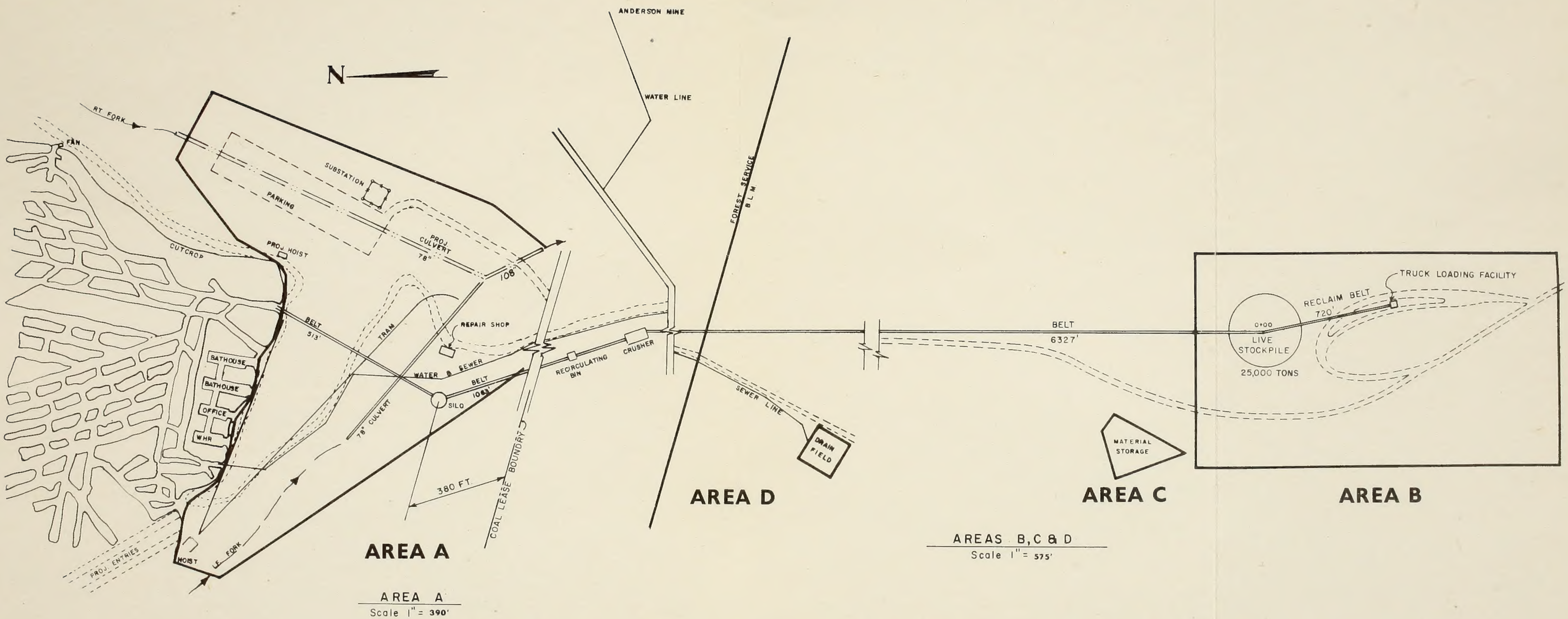


FIGURE 1-22

WILBERG MINE SITE (AREAS A, B, C, D)

service road to the mine to minimize environmental disturbance. The conveyor belt would be 48 inches wide and would carry 1,200 tons of coal per hour.

The stockpile (Area B) would be conically shaped and covered to divert precipitation. Drainage ditches would divert upslope runoff around the stockpile to avoid any contamination of natural runoff by coal dust. Any water contained in the coal would drain to the bottom of the stockpile and would be collected in an inner ditch where it would evaporate. Reclaim from the live stockpile would be conducted by rotary plow to load a conveyor which would carry the coal to a batch weighing and sampling system. Coal haul trucks would pass under the weighing and sampling house in a circular traffic pattern as shown on Figure 1-22. The stockpile and loading area would consist of 54 acres.

An abandoned oil well site, covering approximately 2 acres, would be fenced and used as a materials storage area (Area C, Figure 1-22).

Temporary coal handling facilities now exist for development purposes in the mine mouth area. Presently, a temporary conveyor carries coal from development areas in the mine to a temporary crusher. The discharge from the crusher enters a temporary chute which conveys the coal to a temporary truck bin at the foot of the slope below the portal. Coal haul trucks are loaded as necessary to remove development production of coal. When trucks are not being loaded, coal is stored on the ground near the foot of the truck bin. This temporarily stored coal is reclaimed, utilizing a front-end loader.

6. Coal Transportation System

The coal would be transported from the mine over a 1.5-mile

elevated coal conveyor to a 25,000-ton live stockpile storage yard. From the storage yard, the coal would be hauled by truck to the plant area. The haul road would continue as a service road from the storage area, 1.5 miles to the mine portal. The total length would be 12.5 miles. The distance the coal would be trucked from the storage area to the plant site would be 11 miles. The proposed route with milepost references is shown on Figure 1-23. (Profile maps with the milepost references are used extensively in Chapter 2 to describe the existing environment.) About 4.1 miles of new road would be constructed. The remaining distance would be over upgraded county and state roads. The asphalt paved road would consist of two 12-foot lanes with 4-foot shoulders in an 80-foot right-of-way. The right-of-way would be enclosed within a 42-inch high fence using 32-inch high woven wire mesh with two barbed wires on top. A 150-foot bridge, 32 feet wide, would be built over Cottonwood Creek. The bridge would be a prestressed concrete or steel girder structure with a concrete deck. A bridge would also be built over the Western Irrigation Canal. Underpasses at Highway U-10 and U-29 are proposed. The haul road would be open to public travel, and eventually the new section would be dedicated to Emery County.

The coal haul road would cross the following lands:

	(mi)	(acre)
UP&L private lands	4.1	39
Existing county road		
National resource lands	2.0	19
National Forest lands	0.8	8
State of Utah lands	1.1	11
Private lands	2.0	19
Existing State highway	2.5	24
TOTAL	12.5	120

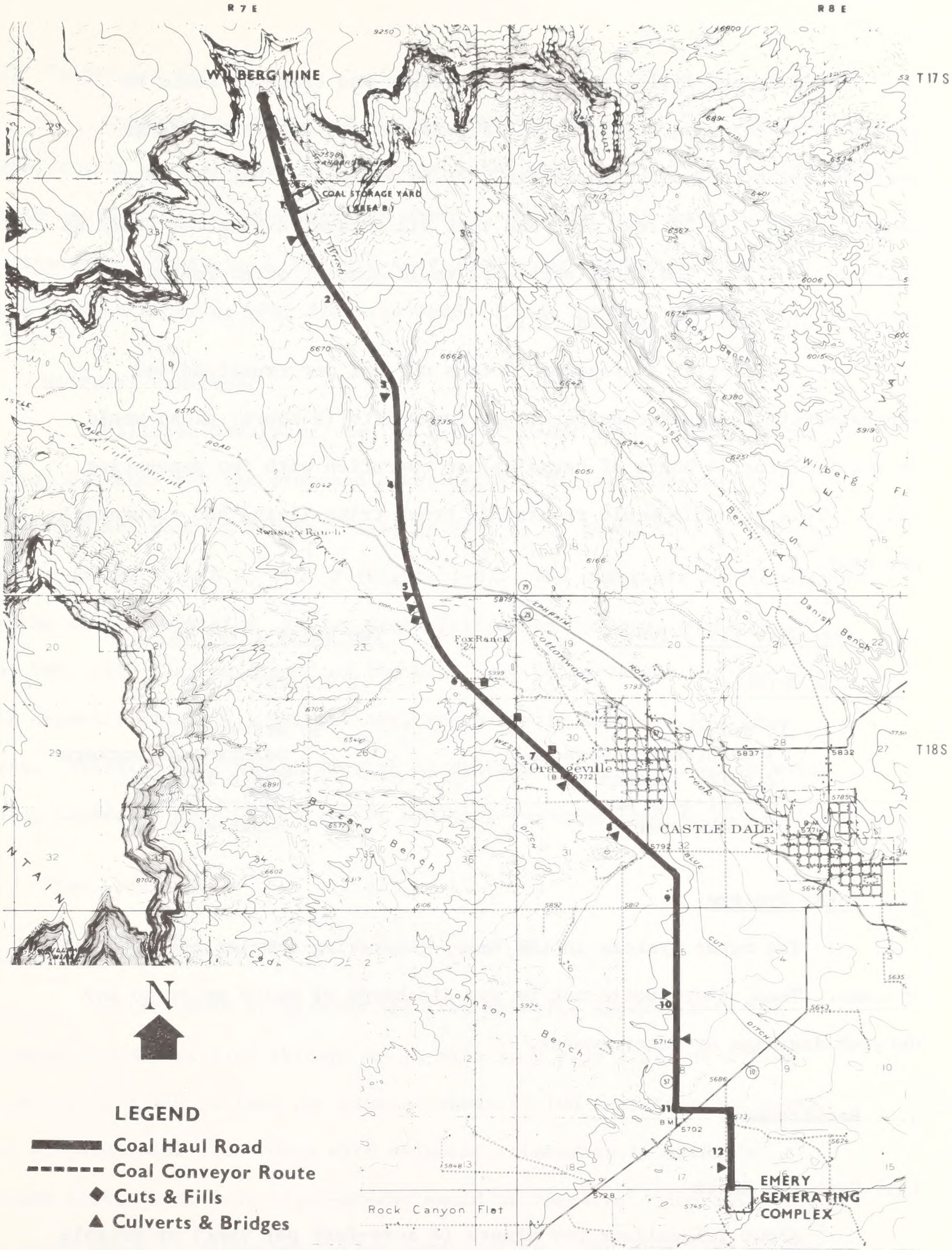


FIGURE 1-23

PROPOSED COAL HAUL ROAD AND CONVEYOR ROUTE

Cuts and fills, as well as culverts and bridges, would be required, as shown in Figure 1-23. Provisions for cattle crossings would be negotiated with landowners. It is estimated that the cuts would be from 6 to 10 feet deep and that all excavated material would be utilized as fill. The total earthwork would consist of approximately 50,000 cubic yards of cut and fill.

Assuming an average of 30 tons of coal per truckload and approximately 18 truckloads per hour, two shifts (8 hours, plus) would be required for 24 hours of normal plant operation with two generating units. This schedule would require 36 truck trips (going and returning) per hour.

One Unit (1977-1978)	Two Units (1979 on)
2 Shifts:	2 Shifts:
18 drivers	36 drivers
3 maintenance workers	6 maintenance workers
2 shift foremen	2 shift foremen
1 tool-room man	1 tool-room man
1 bookkeeper	1 bookkeeper

7. Water Systems

The water systems in the Emery generating complex are all "closed" systems. Thus, there would not be any discharge of waste water to any natural drainage or water course.

a. Requirements

(1) Domestic Water

About 2.5 gallons per minute (4 acre-feet per year) of potable water would be needed at the generating site. This supply would come from the Clawson water system.

(2) Industrial Water

Consumptive water use for both generating units (860 MW rated capacity) is estimated to be less than 7,000 acre-feet per year. Consumptive water use by project components is shown in Figures 1-14 and 1-15. Contractural rights to 7,000 acre-feet of appropriated water annually have been obtained by UP&L from the Ferron Creek Irrigation Company.

b. Millsite Reservoir

Millsite Reservoir, fed by Ferron Creek, would be the primary source of water for the proposed power plant. Millsite Reservoir is about 3 miles west of Ferron, Utah, in Sec. 7, T. 20 S, R. 7 E, and in Sec. 1 and 12, T. 20 S, R. 6 E (Figure 1-8). The reservoir was constructed by the current operator, Ferron Creek Irrigation Company, under Public Law 566, with the assistance of the U.S. Soil Conservation Service (SCS). The capacity of the 414 surface-acre reservoir is about 18,500 acre-feet. Millsite Dam, though located on private property, backs up water which inundates about 200 acres of national resource land at maximum level.

c. Pipe Line

(1) General Description

Water would be gravity fed from Millsite Reservoir to the generating complex site through an 11-mile long pipe line, at a flow capacity of 9,370 gallons per minute (about 15,100 acre-feet per year). The proposed pipe line route with milepost references is shown in Figure 1-24. A 25-foot right-of-way would be required. Approximately 33 acres would be disturbed during construction. The pipe line would cross private land.

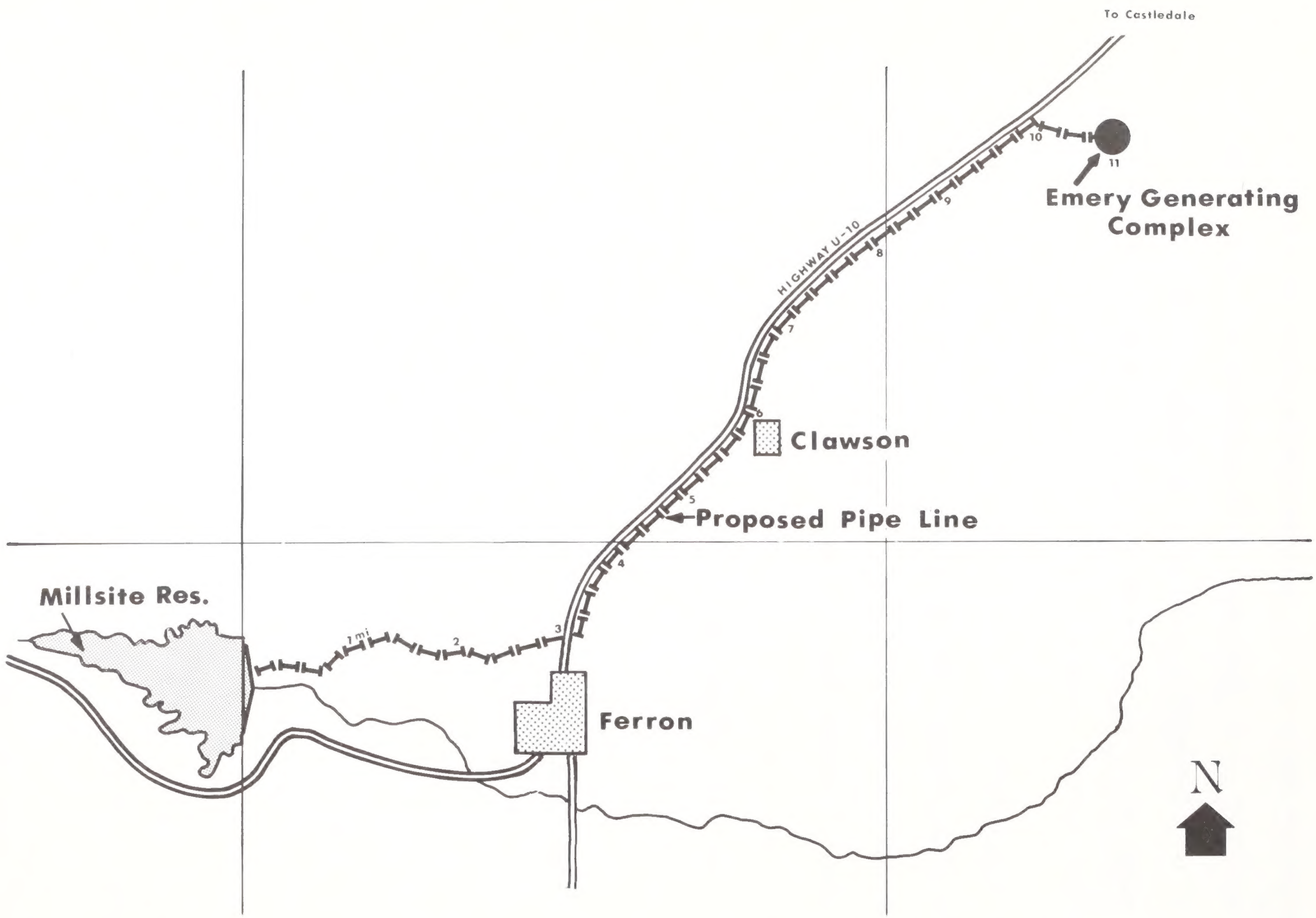


FIGURE 1-24

PROPOSED PIPE LINE ROUTE

The pipe would be constructed of fiber glass; cement lined, coated, and wrapped. The inlet diameter would be 27 inches. The design pressure on the pipe would be less than 150 pounds per square inch. A pressure control pond would be located near Clawson. In addition, there would be various shutoff valves, vacuum relief valves, and pressure relief valves in the line.

(2) Construction and Maintenance

A trench, 4 feet wide and an average of 8 feet deep, would be excavated near the center of the right-of-way. The pipe would be buried at least 4 feet deep on a selected rock and sandfill cradle. The uppermost part of the backfill would be native soil lightly compacted and graded. The working area would be reseeded, except for the access road.

The pipe line would be placed at least 4 feet underground at wash crossings and at other surface obstacles, except at Rock Canyon Creek, where the pipe line would cross above the creek adjacent to the highway bridge. An unpaved road, approximately 8 feet wide occupying 10.7 acres, would be built within the right-of-way during construction.

Semitrailer trucks, a crawler-mounted backhoe, a crawler tractor, and lighter equipment would be used by an estimated 22-man construction crew.

d. Water Treatment System

Water from Millsite Reservoir would require treatment before use in the generating complex. Intermittent chlorination, softening with lime and sodium zeolite, coagulation with alum, and stabilization

with sulfuric acid would be required to produce suitable boiler feed-water.

At an average water use of 4,300 gallons per minute, the water treatment system would require about 2,200 tons per year of lime, about 210 tons per year of alum and about 4 tons per year of an additional proprietary coagulant. Materials used in the water treatment system would be purchased from commercial sources. The sludge produced would amount to about 1 percent of the ash produced from burning of coal. The sludge would be trucked to the ash disposal area.

8. Transmission Lines

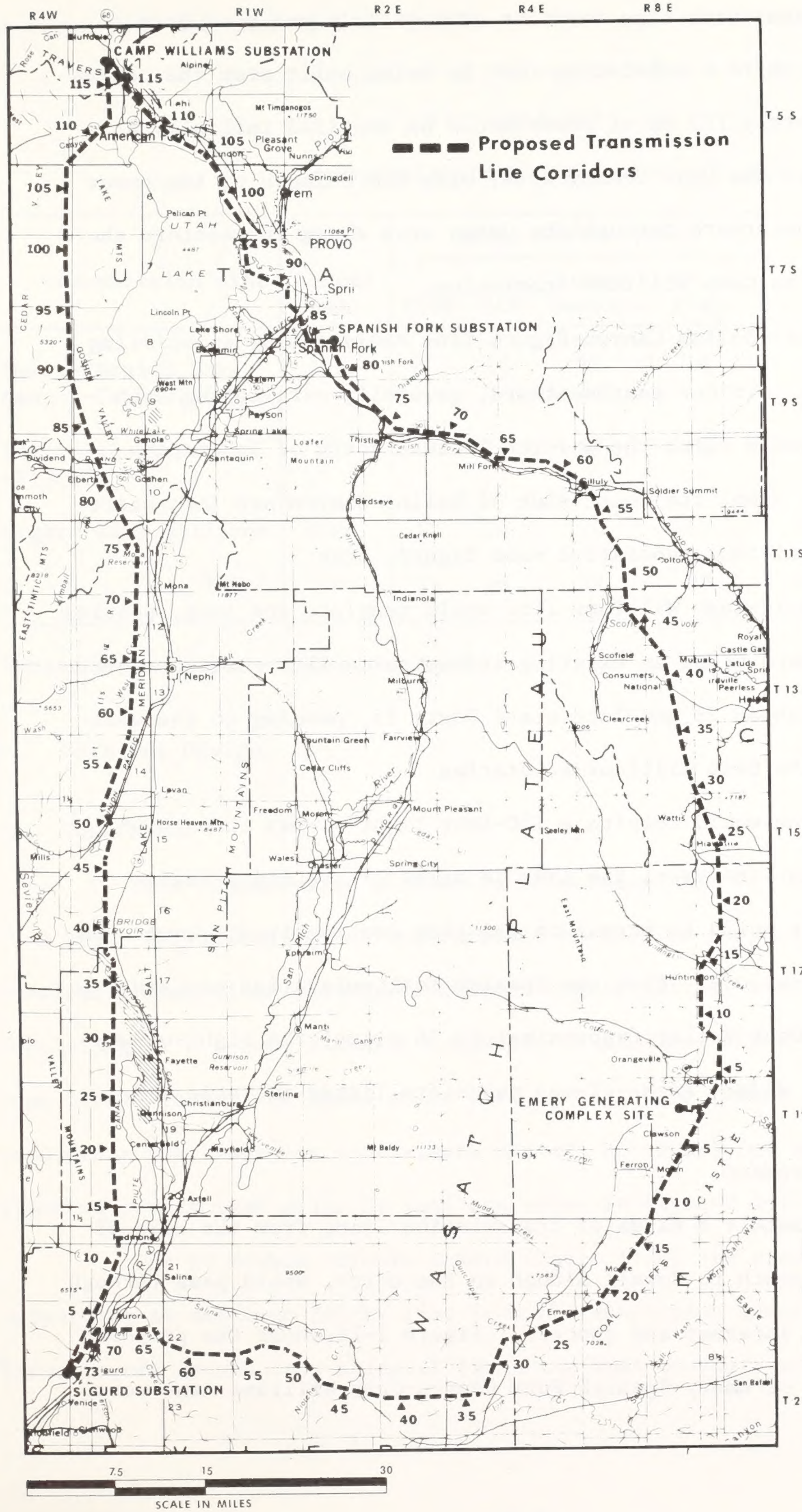
The UP&L proposes to construct two 345-kV transmission lines from the proposed Emery generating complex to bulk distribution centers at Sigurd and Camp Williams, Utah. Another 345 kV line would be built to supplement an existing tie between Camp Williams and Sigurd. Figure 1-25 shows the proposed transmission line corridors.

a. Routing

(1) General

Between the proposed Emery 345-kV switchyard and the Huntington 345-kV switchyard, the Emery-Spanish Fork Canyon-Camp Williams 345-kV transmission line would utilize the existing Huntington-Sigurd 345-kV transmission line. This line would be looped into the proposed Emery switchyard.

New construction of the Emery-Spanish Fork Canyon-Camp Williams transmission line would commence at the Huntington switchyard. From there the line would go over the Wasatch Plateau, enter the existing



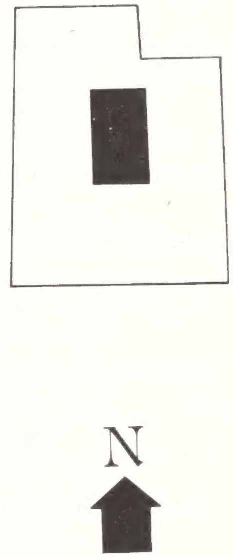


FIGURE 1-25

PROPOSED TRANSMISSION LINE CORRIDORS

Spanish Fork transmission line corridor near Gilluly and pass down Spanish Fork Canyon to a substation that is being built near the canyon mouth. Approximately 175 MW of power would be supplied initially at this substation to the Utah County area, with the balance of the power transmitted northwestward through the urban area along the eastern shore of Utah Lake to the Camp Williams substation.

The Emery-Salina Canyon-Sigurd line would follow an existing transmission line corridor southwestward, generally paralleling Utah Highway 10. It would climb the Wasatch Plateau north of Interstate Route 70, passing along the south side of Salina Canyon and Interstate Route 70 to the existing substation near Sigurd, Utah.

The Sigurd-Camp Williams line would complete the loop, passing almost due northward along an existing transmission line corridor which parallels Utah Highway 28 and Interstate Route 15, passing to the west of Utah Lake to the Camp Williams substation.

Each line would require a 130-foot right-of-way throughout most of its length. However, the last 10 miles of the Emery-Salina Canyon-Sigurd line would be strung on existing double-circuit towers in an existing right-of-way. From the Spanish Fork substation to Camp Williams through Utah Valley (approximately 36 miles) the right-of-way would be 120 feet wide. Right-of-way needs are listed in Table 1-9.

(2) Provo City Segment

Approximately 6 miles of transmission line, from the head of Provo Bay on the south to Powell Slough on the north, would pass through an area of public interest and concern. Figure 1-26 shows the proposed location (segment of Emery-Spanish Fork Canyon-Camp Williams line west

of Provo City and east of Utah Lake).

TABLE 1-9

Transmission Line Right-of-Way Needs

Transmission Line	Total Length (mi)	Land Status (mi)					Total	
		USBR	BLM	Forest Service	State	Private	(mi)[a]	(acre)
Emery-Spanish Fork Canyon-Camp Williams	118	1	17	17	6	77	118	1,816
Emery-Salina Canyon -Sigurd	73	0	18	20	4	21	63	993
Sigurd-Camp Williams	118	0	34	0	13	71	118	1,860
TOTAL	309	1	66	37	23	169	299	4,669

[a]Miles of new right-of-way required.

b. Size and Design

(1) General

Each transmission line would be designed for 345,000 volts (345 kV). Galvanized, steel towers would be used to support one or two overhead ground wires and six conductors (three pairs), each conductor consisting of a 1-inch diameter composite of aluminum wires over a steel rope core. Table 1-10 shows where various styles of towers would be used along the lines and approximate numbers of towers for each line. Types of towers that would be used are shown in Figures 1-27 and 1-28.

The 63 double circuit towers (Table 1-10) are presently in place, supporting an existing 345-kV line from the Huntington generating complex. These towers extend from milepost 63 at the west boundary of the Fishlake

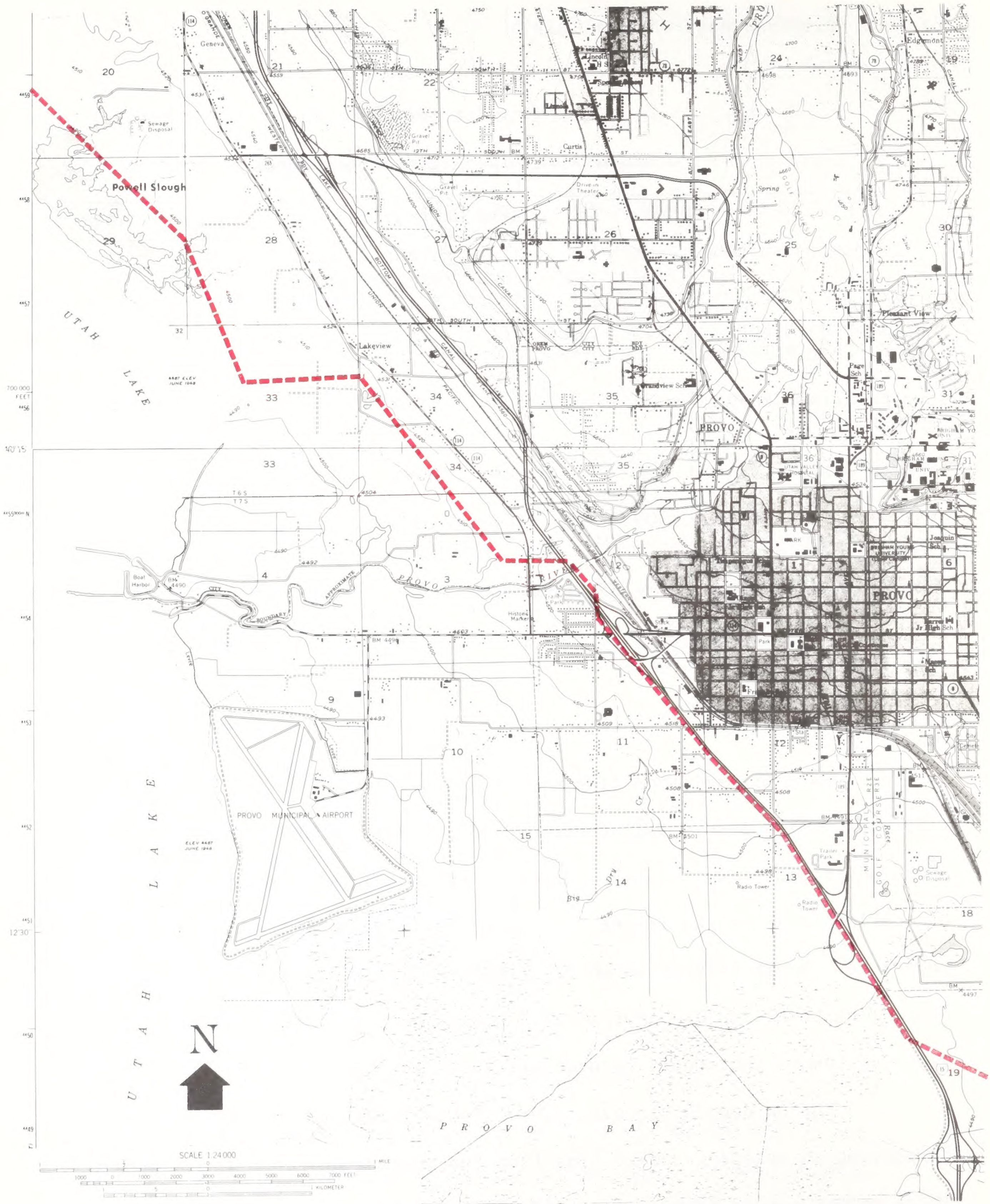
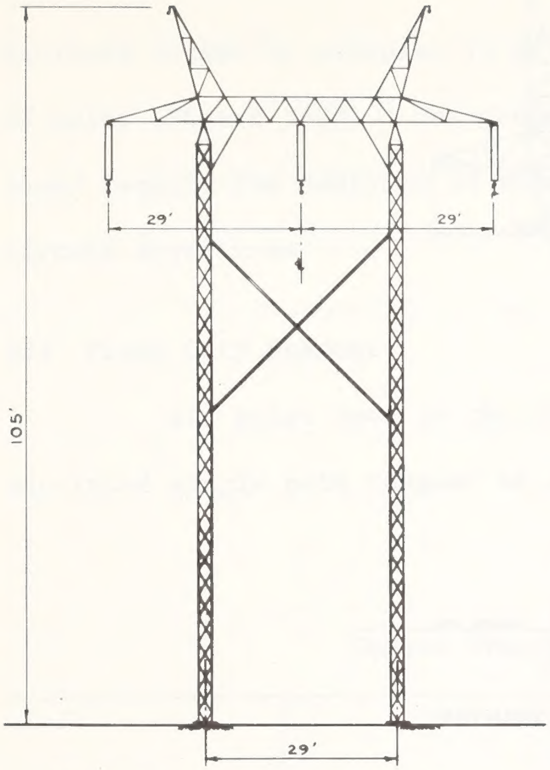
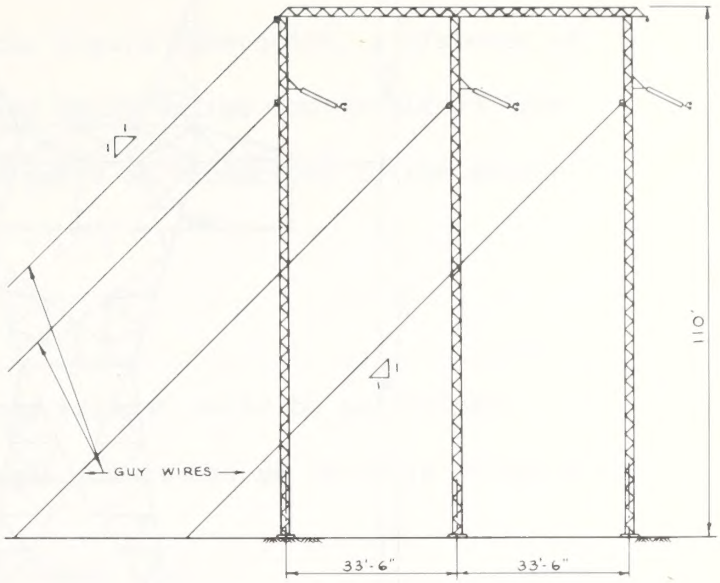


FIGURE 1-26

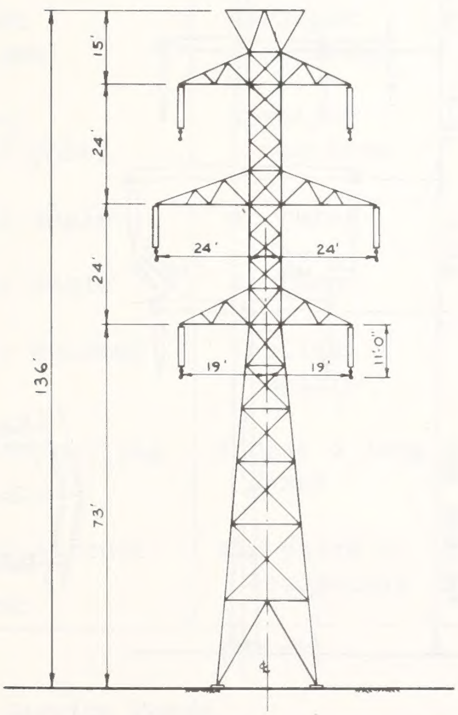
PROVO TRANSMISSION LINE ROUTE



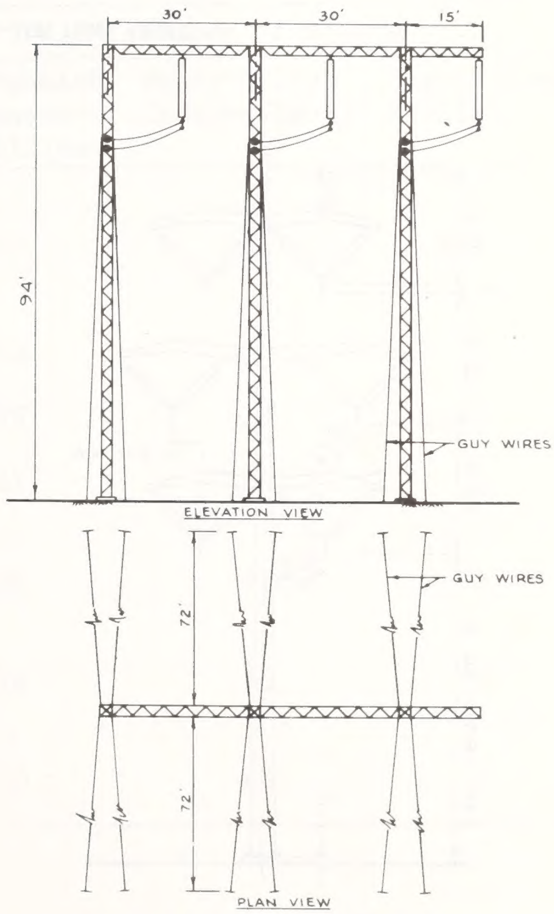
345 kV H FRAME STEEL TANGENT STRUCTURE



345 kV STEEL ANGLE STRUCTURE



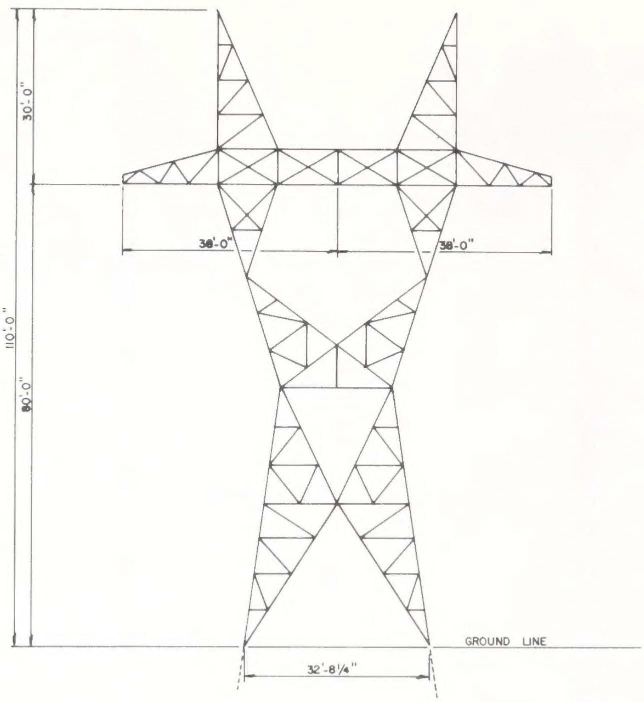
345 kV DOUBLE CIRCUIT STEEL TANGENT STRUCTURE



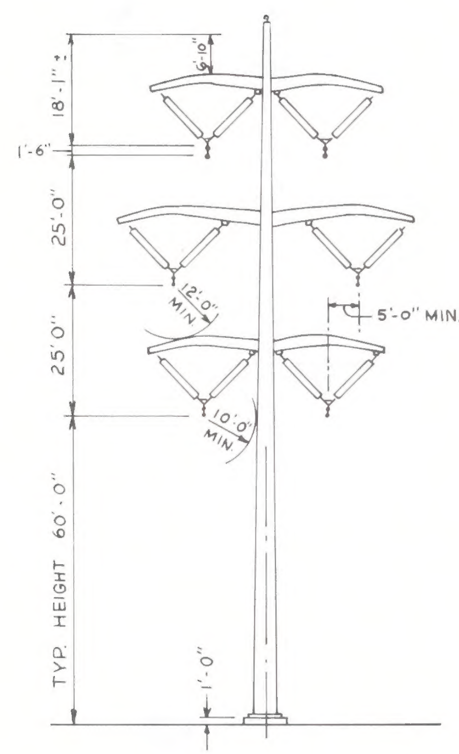
345 kV STEEL DEADEND STRUCTURE

FIGURE 1-27

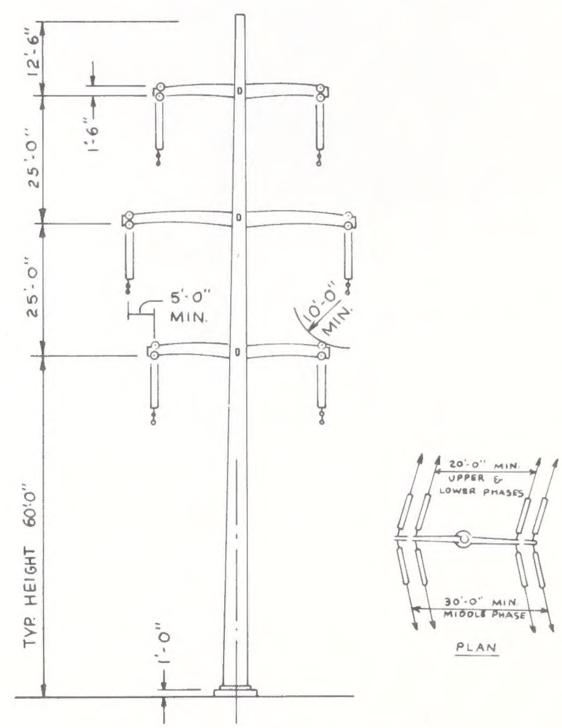
TRANSMISSION TOWER STRUCTURES



345 kV STEEL SELF-SUPPORTING STRUCTURE



345 kV DOUBLE CIRCUIT TANGENT STRUCTURE



345 kV DOUBLE CIRCUIT ANGLE STRUCTURE

FIGURE 1-28

TRANSMISSION TOWER STRUCTURES

National Forest to milepost 73 at the Sigurd substation, a distance of 10 miles (Figure 1-25). The proposed Emery-Salina Canyon-Sigurd line would require the addition of three pairs of conductors to the double circuit structures.

(2) Provo City Segment

All poles used in the Provo segment would be galvanized, unpainted single pole tangent or angle structures as shown in Figure 1-28.

TABLE 1-10

Towers Proposed for Transmission Lines

Type	Use	Number of Towers: Emery-Spanish Fork Canyon-Camp Williams	Emery-Salina Canyon-Sigurd	Sigurd-Camp Williams
Tangent (H frame)	Straight sections	277	354	593
Tangent (steel pole)	Straight sections	153	0	0
3-Pole angle	At turns	45	32	25
1-Pole angle	At turns	27	0	0
3-Pole deadend	Vertical uplift	30	41	25
Self-supporting	Stress & long spans	10	50	0
Double circuit	Six pairs of conductors	0	63	0

c. Service Roads

Existing access roads would be used for construction and maintenance of the Emery-Salina Canyon-Sigurd and the Sigurd-Camp Williams

transmission lines. About 40 miles of new unimproved access roads would be required between Wattis and Gilluly, from milepost 25 to milepost 55, along the route of the Emery-Spanish Fork Canyon-Camp Williams line (Figure 1-25). The UP&L proposes to permanently maintain about 20 miles of this access road after construction. The remaining 20 miles would be stabilized, reseeded and closed to public use.

d. Construction Phases and Activities

Preconstruction and construction activity would continue year round, with work proceeding at higher elevations (predominantly National Forest lands) during the summer and at lower elevations (mostly on private and national resource lands) during the cooler months.

Staging areas would be on private land near railheads at the end of each transmission line. Various types of equipment that would be used in the construction phases are shown in Table 1-11.

TABLE 1-11

Types of Equipment Used in Construction of Transmission Lines

	Equipment								
Construction Phase	Pickup Trucks	Heavy Trucks	Backhoe	Crawler Tractor	Rubber-tired Tractors	Crane	Hydro-seeder and Drill	Helicopters	Pile Driver with Barge or Matting
Installing Gates	X		X						
Access		X		X					
Excavation & Digging	X	X	X						
Hauling Material				X	X				
Framing	X	X		X					
Erection of Towers		X		X	X	X		X	X
Stringing Conductors		X		X	X			X	
Sagging Conductors	X	X		X					
Clipping Conductors	X	X							
Cleanup & Restoration	X	X	X	X					
Revegetation					X		X		

The following are proposed construction phases:

(1) Installing Gates

Wire gates would be built where transmission line would cross existing range or farm fences.

(2) Constructing Access Roads

Construction of new access roads would involve clearing of vegetation. The average width of access roads would be 12 feet.

(3) Excavating and Digging

Each structure site would be cleared of vegetation; holes would be dug for poles and anchors. Approximately 0.25 acre of vegetation would be cleared for each structure. If helicopers were used, vegetation clearing could be held to less than 0.01 acre for each structure.

(4) Hauling

It would be necessary to haul poles, cross arms, braces, insulators, and associated hardware to each structure site.

(5) Framing

Each structure would be assembled on site.

(6) Erecting Poles

The erecting operation would include hoisting of structures and placement of assembled structures, plus leveling, squaring, backfilling, and anchoring. If helicopters were to be used in the operation, then leveling would not be required. Pile drivers would be needed for placing footings for the towers across the marshy areas around Provo Bay and Powell Slough. If water were high during construction, a barge would be used to float the pile driver. During dry periods, matting would be used.

(7) Stringing

Stringing would involve laying steel cable, pulling lines and stringing conductors through pulleys attached to each pole structure. Six separate conductors (three pairs) would be installed on each structure as well as overhead ground wires.

(8) Sagging

In the sagging operation, conductors would be spliced and pulled to proper tension.

(9) Clipping

Clipping involves moving conductors from the pulleys to insulators previously attached to the structures.

(10) Cleanup and Restoration

This operation would involve overall dressing up and restoration of the total transmission line, including access roads, fences, structure sites, etc.

(11) Revegetation

Native or introduced vegetation would be seeded on disturbed areas. The species planted would be selected on the basis of seed availability, adaptability to site, and aesthetic compatability with surrounding vegetation.

e. Maintenance

The UP&L would patrol the line every month with fixed wing aircraft, every 6 months with helicopter, and every 12 months on foot. Line maintenance would vary from routine inspections to emergency repairs required to restore line service. The lines would be maintained using the same types of equipment used during construction.

9. Waste Production and Disposal

a. Solid Waste

(1) Ash

It is predicted that coal to be used at the Emery generating complex would have an ash content of about 10.10 percent. However, in the design of the ash disposal area, a worst-grade coal with an ash content of 11.97 percent was inferred. On the basis of worst-grade coal, about 780 tons per day (approximately 10 million tons over the life of the project) of ash would be produced. The chemical composition of the ash, based on available samples, is shown in Table 1-12.

TABLE 1-12

Chemical Composition of Ash

Constituent	Symbol	Percent
Phosphorus pentoxide	P_2O_5	0.88
Silicon dioxide	SiO_2	51.62
Ferric oxide	Fe_2O_3	4.73
Aluminum oxide	Al_2O_3	22.30
Titanium dioxide	TiO_2	1.24
Calcium oxide	CaO	7.80
Magnesium oxide	MgO	0.67
Sulfur trioxide	SO_3	5.21
Potassium oxide	K_2O	0.34
Sodium oxide	Na_2O	4.46
Undetermined and trace		0.75
	TOTAL	100.00

Bottom ash would be carried in a water slurry from the boilers to dewatering bins. The fly ash collected by the electrostatic precipitator would be collected dry in the fly ash silo. The bottom ash (dewatered) and the fly ash (moistened) would be hauled by truck approximately 1 mile over the ash haul road to the disposal area. About 380 acres would be available for the ash disposal area east and southeast of the plant site. About 160 acres would be filled to an average depth of 15 to 25 feet over the 35-year projected life of the generating complex (Figure 1-29).

The area would be diked to prevent runoff from the disposal area into the natural water courses. Ash disposal would follow landfill procedures: a 2-foot depth of soil would be stripped ahead of the fill; the ash would be compacted in the fill; and the 2 feet of topsoil would be replaced atop the ashes (Figure 1-30). Compacted in a damp state, the ashes would have a tendency to cement together.

The ash disposal area would be shaped to form a roughly level area resembling surrounding terrain. Edges would be sloped 4 feet horizontal to 1 foot vertical. Surface rehabilitation would include planting native species in an attempt to restore the surface area to natural conditions.

(2) Garbage and Trash

Solid waste material from plant construction and operation would be deposited in a sanitary landfill at the complex site (Figure 1-11). About 2,000 to 4,000 pounds per week of garbage and trash would be deposited during the construction phase of the plant, and 200 to 400 pounds per week would be deposited during the operating phase. The landfill would be used for the life of the project.

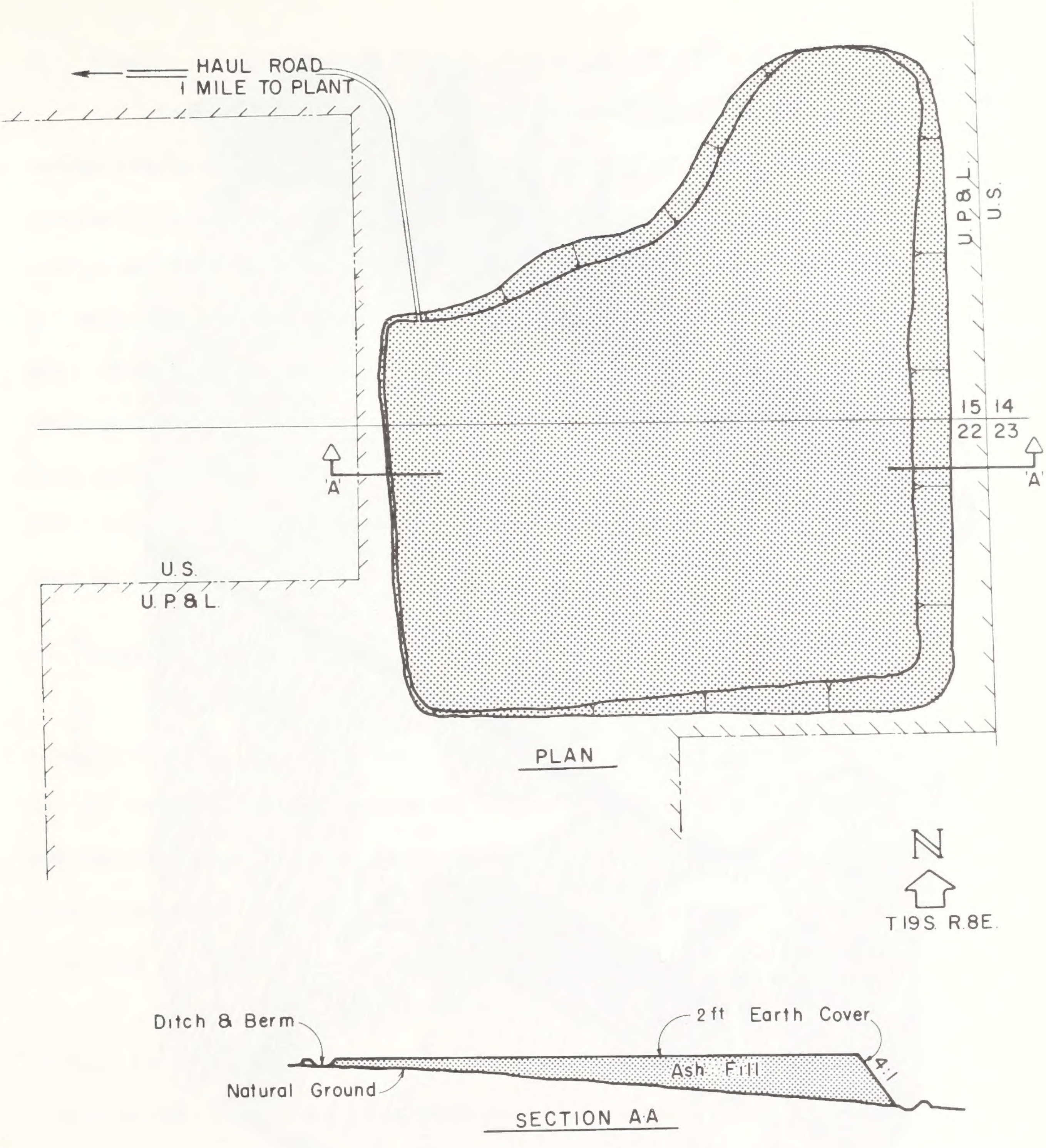


FIGURE 1-29

SOLID WASTE DISPOSAL AREA


10'-0"
DREDGED AREA
2'-0" DEEP
ACTIVE DUMP
AREA
ASH & SLUDGE
COVERED AREA
2'-0" THICK

FIGURE 1-30

b. Sewage

Sewage would be treated in an extended aeration package-type sewage treatment plant. The plant would provide at least secondary treatment as defined by EPA regulations. Following treatment, the sewage would be held in a polishing pond of 0.53 acre-foot capacity. The extended aeration plant would have a capacity of 10,600 gallons per day. The 10,600 gallon capacity figure would allow about 52 gallons of water per day, per person, by a permanent work force of 203. The polishing pond would provide about 2 days detention time at 10,600 gallons per day - enough to allow the escape of residual chlorine. The water would then be recycled.

10. Construction Materials

Construction materials have been or would be obtained by competitive bidding. Some materials could be shipped part way by rail, but all materials would eventually be trucked onto the site. Overweight and oversize permits would be required to allow transportation of the main steam drum, generator stator and rotor, deaerating heater, storage tank, and six beams for the boiler structure.

Cement, sand, and gravel would be transported over public highway by 30-ton belly-dump trucks and dry bulk semitrailers. Sand and gravel would be obtained from commercial sources near Camp Williams.

Pit-run structural fill for the generating complex site is being hauled from a borrow pit on private ground near the generating complex site by 30-ton belly-dump trucks over county roads. A secondary fill site is located on adjacent private land; the fill from this site would be transported over a private road (Figure 1-31). Fill for the

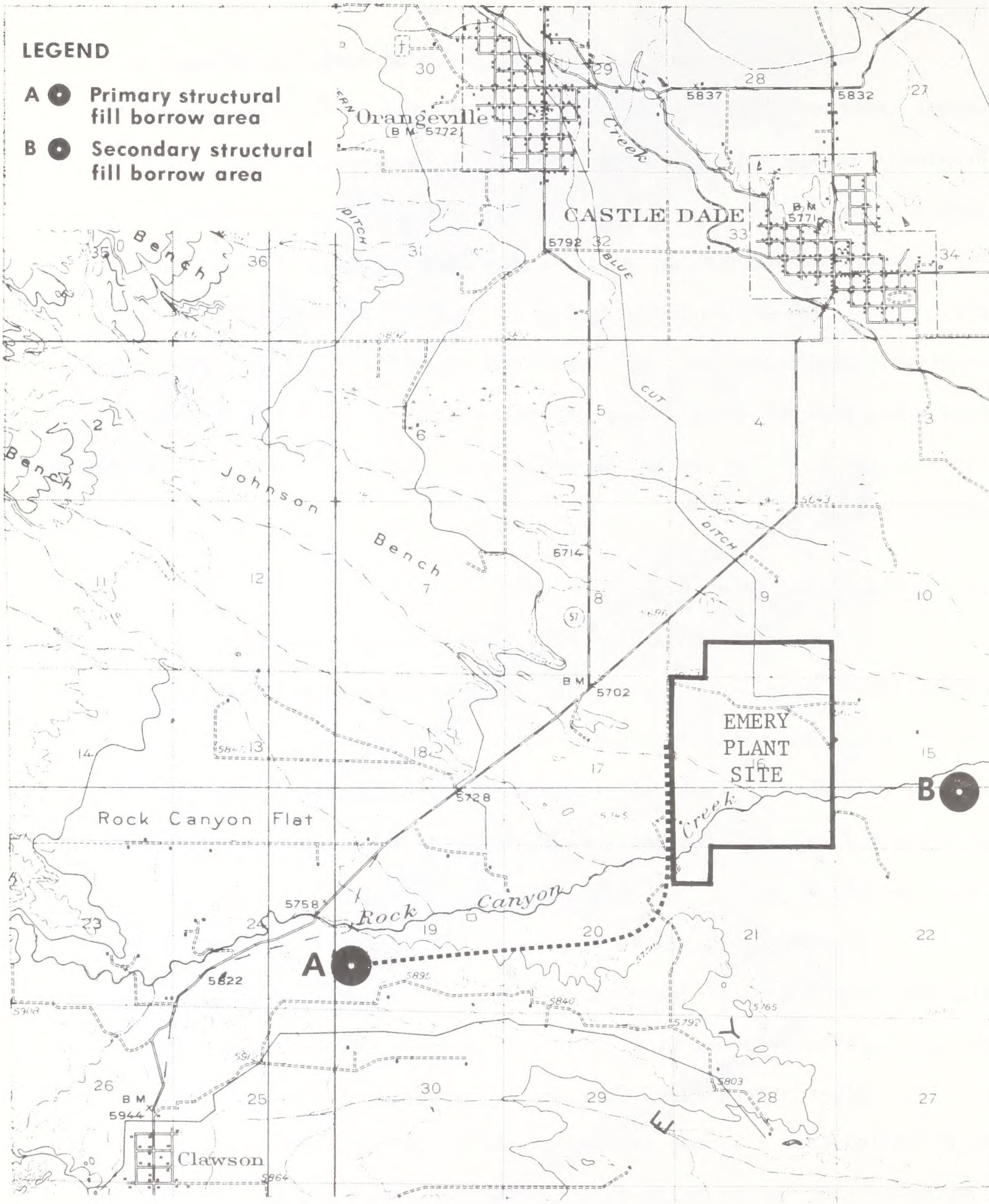


FIGURE 1-31

BORROW PIT LOCATIONS

coal haul road and conveyor would come from cuts along those routes.

Construction materials that would be needed at the generating complex site include:

14,000 tons of steel.

116,000 cubic yards of concrete.

10,000 cubic yards of sand and gravel, in addition to that used in concrete.

2,400,000 cubic yards of pit-run structural fill.

Material needed in construction of the transmission lines would be:

6,565 tons of steel for the Emery-Spanish Fork Canyon-Camp Williams line.

2,640 tons of steel for the Emery-Salina Canyon-Sigurd-line.

4,170 tons of steel for the Sigurd-Camp Williams line.

(Total 13,375 tons of steel)

4,315,000 pounds of aluminum conductor for the Emery-Spanish Fork Canyon-Camp Williams line.

2,925,000 pounds of aluminum conductor for the Emery-Salina Canyon-Sigurd line.

4,045,000 pounds of aluminum conductor for the Sigurd-Camp Williams line.

(Total - 11,285,000 pounds aluminum conductor).

Construction requirements for the coal haul road would be:

about 75,000 cubic yards of cuts and fill.

11 culverts (10 of 21-inch diameter, one of 3-foot diameter, lengths as yet undetermined).

bridge over Cottonwood Creek and the Western Irrigation Canal.

underpasses at Highways U-10 and U-29.

Construction requirements for the water pipe line would be:

11 miles of cement-lined fiber glass pipe (27-inch diameter), plus pressure control facilities.

10,000 cubic yards of select bedding material, sand, and gravel.

11. Work Force

The work force required for construction and concurrent operation of the Emery plant would peak at 1,170 workers anticipated by the second quarter of 1979. The maximum work force would include 700 construction laborers, 140 plant operators, and 330 miners. After construction, 203 workers would be needed to operate both units of the plant. The proposed hiring and manpower schedule is shown in Table 1-8.

Transmission lines would be constructed by highly trained crews of approximately 30 men that would move with progress of construction across country using local public accommodations. One crew would be employed in 1977-78, and two in the 1978-79 construction period (Figure 1-9).

12. Monitoring Program

The UP&L has initiated a monitoring program to establish baseline data so that changes in air quality, water quality, and nearby vegetation can be determined. The following are existing programs that have already generated data which have been used in this statement. Copies of the data are available from UP&L.

a. Visual Range

A visual range study was initiated in 1974 by the University of Utah. As part of the study, a camera, mounted on a tower, was located near Clawson, aimed north toward Price. This camera takes three pictures

daily and would continue to operate throughout the construction and post-construction period. It is expected that the photographs would show any long-term changes in visibility.

b. Meteorological Monitoring

North American Weather Consultants, under contract with UP&L, are continuously monitoring climatological data. A 50 meter meteorological tower is located immediately west of the Emery switch yard. Horizontal wind speed and direction are measured at 10 and 50 meters. In addition, temperature and humidity are measured at the 10 meter level.

c. Stack Emission Monitoring

Continuous in-stack monitoring systems are planned to sample plant stack emissions. Monitoring instruments would be installed to measure SO_2, NO_2, O_2, and opacity. These instruments would provide a continuous reading of pollutant concentrations being emitted from the stack. The excess oxygen would be measured to control boiler firing. The opacity would be measured to determine the visibility of stack emissions.

d. Air Quality Monitoring

An air quality monitoring program is being conducted by the University of Utah. The program includes the following studies:

(1) Particulates

(a) High-volume particulate sampling daily for total suspended particulates.

(b) Low-volume sampling daily and weekly for total suspended particulates.

(c) Monthly dust-fall sampling.

(2) Gases

Sulfur dioxide, NO_2, and ozone monitoring is performed for a 2-month period during each of the four seasons in the general area of the power plant. The results of the monitoring will be used to determine seasonal effects on ambient air pollutant concentrations.

e. Water Quality Monitoring

Both water quantity and quality are being monitored at the following sites:

(1) Ferron Creek at Millsite Reservoir outlet (biweekly).

(2) Rock Canyon Creek above and below power plant site (weekly).

(3) Johnson Bench Creek at the site (weekly).

(4) Two site drains (weekly).

(5) Cottonwood Creek (where baseline data have been established).

f. Vegetation

In June, 1974 the University of Utah was contracted to develop a vegetation map of the Emery area; to develop a species list; and to establish permanent vegetation study plots to determine stress, vigor, reproduction, damage, and disease on and among native plants. Results from this study would be used to determine the effect of the Emery power plant on local vegetation.

CHAPTER 2

DESCRIPTION OF THE ENVIRONMENT

2

CHAPTER 2

DESCRIPTION OF THE ENVIRONMENT

A. INTRODUCTION

Chapter 2 describes, in summary form, environmental components likely to be impacted by the proposed action. Discussions on environmental components relate to (1) the broader regional setting and aspects of ecological, social, and economic interrelationships likely to be impacted, and (2) specific areas which would likely be impacted. Descriptions presented are commensurate with the expected magnitude, intensity, duration, and incidence of impacts. The probable level of economic development, land use, and related sociocultural factors of the impact areas and surrounding region, without the proposal, are also presented. Since construction is now under way, the Huntington generating complex second unit along with the first unit will be considered as part of the existing environment.

B. EXISTING ENVIRONMENT

1. Climate

The climate of the Emery and Carbon county area is generally semiarid, characterized by low relative humidity, abundant sunshine, low to moderate precipitation, warm summers and cold winters. Seasonal and daily variations in temperature can be extreme. In the area of the generating complex the average annual temperature is 46° Fahrenheit (F). July is the warmest month (70° F) and January the coldest (20° F). Wide daily temperature ranges are caused by relatively strong daytime insolation and rapid nighttime cooling. Average annual precipitation is 8.19 inches, with distribution in two peak periods, summer and winter.

Greatest precipitation is received from summer thunderstorms and most of the remainder from winter snowfall. Relative humidity ranges from a summer average of 40 percent, to a winter average of 75 percent.

2. Air Quality

Air quality is a function of air pollution sources and dispersion conditions. Dispersion conditions are in turn influenced by wind movement patterns and atmospheric stability. Throughout most of the year dispersion conditions in the area of the generating complex are generally good, especially in spring and summer months. Winter months show the poorest pollution dispersion conditions with low mixing depths accompanied by relatively weak winds. Periods of combined low mixing depths and low wind speeds result in limited dispersion conditions which average four to five times per winter (November to February) and last 5 to 7 days.

a. Air Movement Patterns

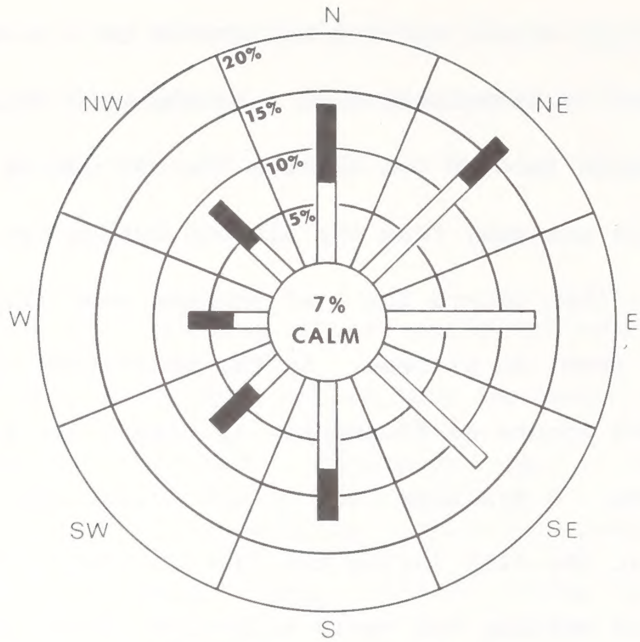
Meteorological studies have been conducted in the area by North American Weather Consultants (NAWC) under contract to Utah Power and Light Company (UP&L) to characterize wind patterns and atmospheric stability structure (Anderson and Hovind, 1973; Hovind, 1973; Sutherland, 1974; Anderson and Sutherland, 1974; UP&L, 1973, 1974; and VTN, 1975). Two independant studies were performed additionally under contract by VTN Colorado and H.E. Cramer, consultants.

The generating complex site is on relatively flat terrain, though there is an abrupt rise to over 2,000 meters (8,500 feet mean sea level [MSL]) on the Wasatch Plateau less than 10 kilometers (6 miles) to the northwest and west. The elevation at the proposed site is approximately 1,800 meters (5,900 feet) MSL.

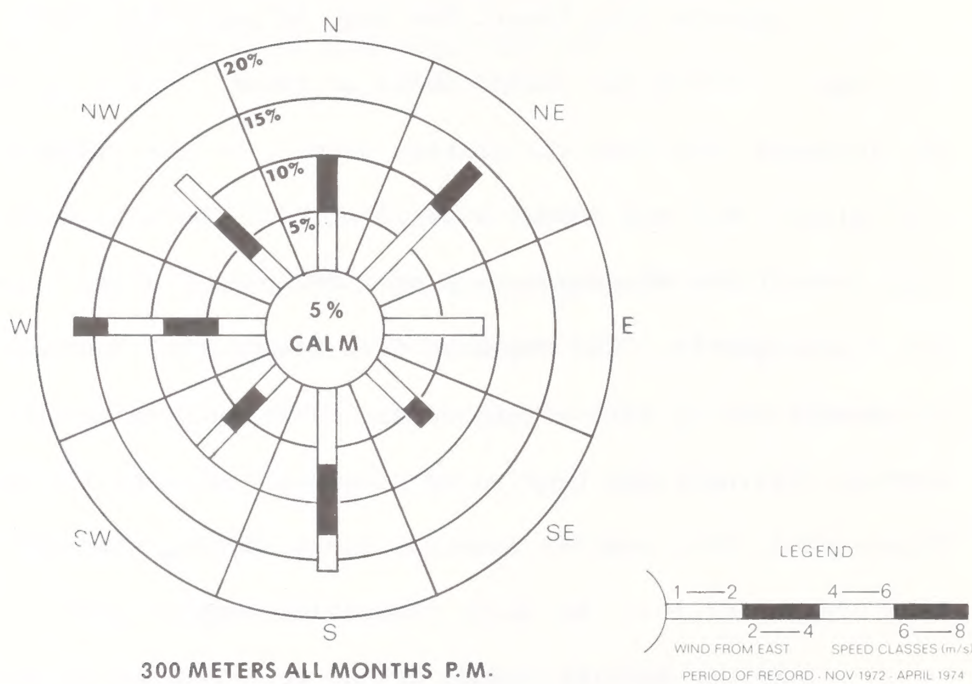
Surface winds extending from the ground to a height of 300 to 400 meters are primarily associated with a local, well organized, upslope flow toward the eastern face of the Wasatch Plateau during late morning and afternoon. Winds are away from the plateau during the night and early morning. This flow toward the east becomes less organized with increasing distance from the plateau. At the generating complex site, a flow toward the north occurs as frequently as toward the east and southeast, away from the plateau. A drainage flow of air toward the east and southeast prevails at the site during the late afternoon until early morning. During late morning and early afternoon, flows from the east and southeast toward the plateau and toward the north occur with equal frequency.

Upslope flow toward the west is generally light, averaging less than 2 meters per second (m/s) or about 4 miles per hour (mi/h). The drainage flow from the plateau toward the east is generally stronger, averaging 4 to 5 m/s (about 9 to 11 mi/h). The upslope flow toward the east face of the plateau occurs most frequently around noon during fall and winter months. The drainage flow toward the southeast occurs most frequently during late afternoon and early evening in spring and summer months. Spring winds tend to be strongest and winter winds lightest. Figures 2-1, 2-2, and 2-3 are wind roses showing wind aloft developed from studies made at the Emery generating complex site.

In the morning, winds at 300 meters altitude are most frequently from the northeast and east and typically very light (Figure 2-1). Between 300 and 500 meters (1,000 to 1,600 feet) there is a transition layer characterized by approximately equal occurrences of winds from the



300 METERS ALL MONTHS A.M.



300 METERS ALL MONTHS P.M.

FIGURE 2-1

WIND DIRECTION, SPEED, AND FREQUENCY AT 300 METERS (984 FEET) ABOVE SURFACE AT PROPOSED EMERY SITE

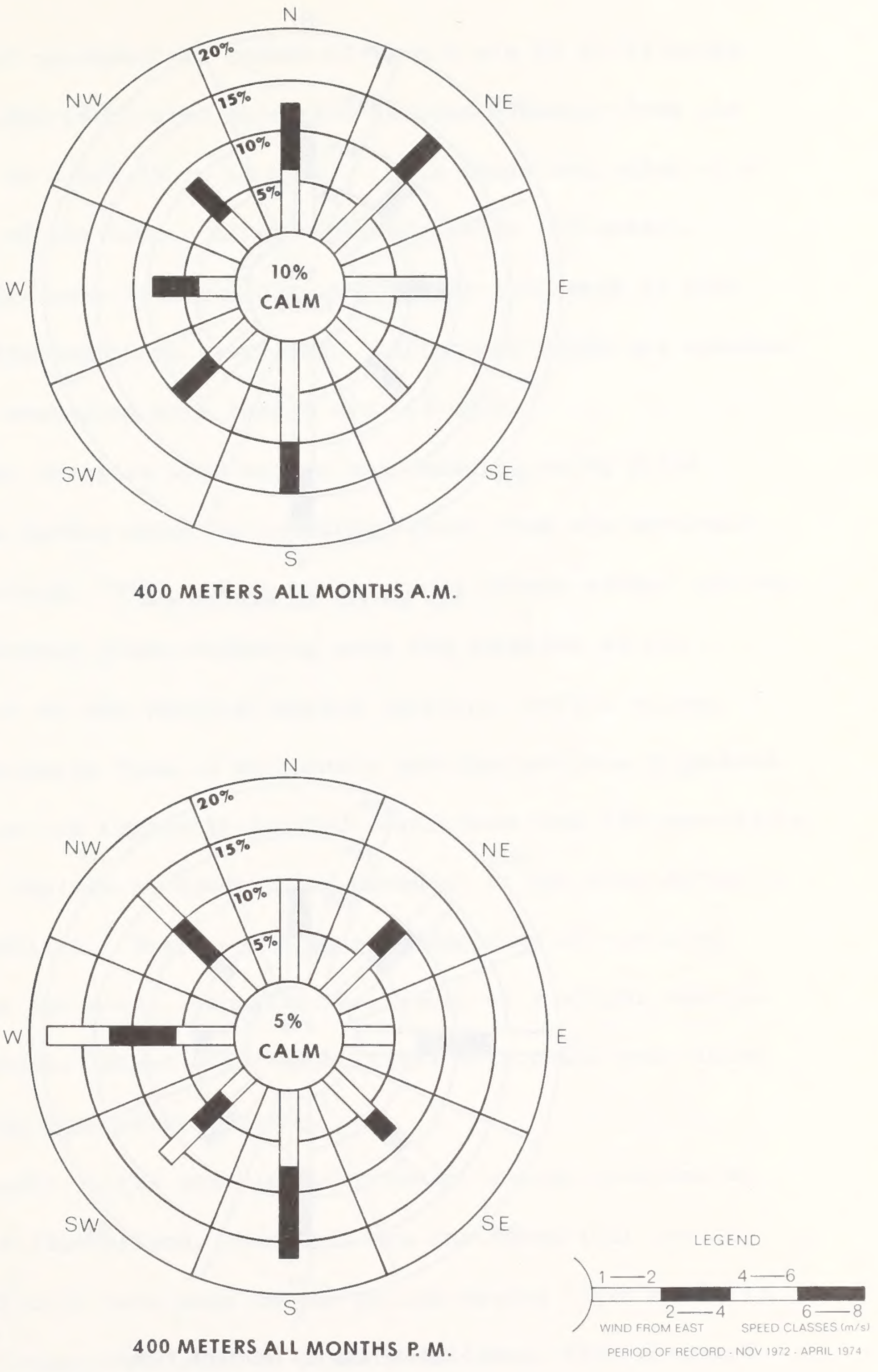
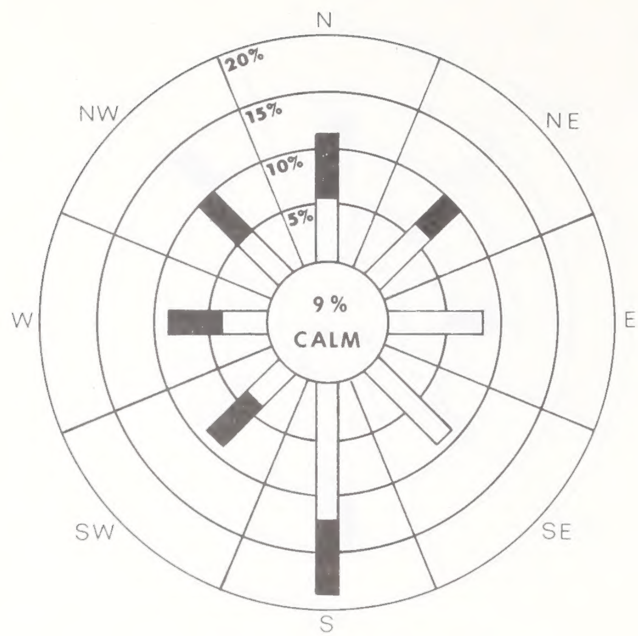
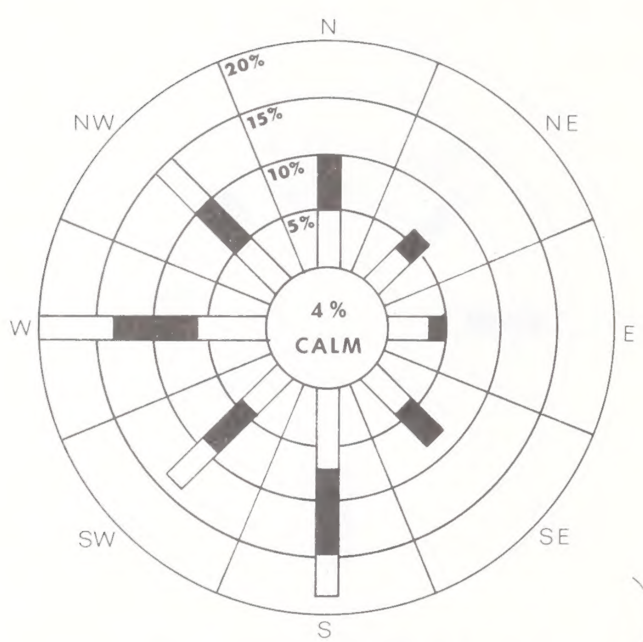


FIGURE 2-2

WIND DIRECTION, SPEED, AND FREQUENCY AT 400 METERS (1,300 FEET) ABOVE SURFACE AT PROPOSED EMERY SITE



500 METERS ALL MONTHS A.M.



500 METERS ALL MONTHS P. M.

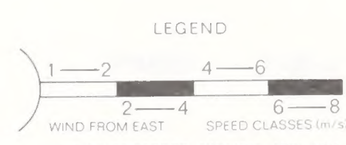


FIGURE 2-3

WIND DIRECTION, SPEED, AND FREQUENCY AT 500 METERS (1,640 FEET) ABOVE SURFACE AT PROPOSED EMERY SITE

northeast, south, and southwest at speeds of 4 to 6 m/s (9 to 13 mi/h). Above 500 meters (1,600 feet) wind direction is predominantly from the south and west at 4 to 6 m/s (9 to 13 mi/h). East winds and calms occur less than 5 percent of the time. Afternoon winds below 450 meters (1,476 feet) typically come from two directions with northeast to east winds occurring as frequently as west winds. Afternoon winds are somewhat stronger, typically averaging more than 6 m/s (13 mi/h).

Significant vertical wind motion was measured using pilot balloon observations during moderate to strong winds from the northwest (Anderson and Sutherland, 1974). Such motion could affect either lofting or sinking of an emission plume depending upon the location of the emission with respect to the vertical motion pattern. With a strong westerly through northerly flow, a stationary wave pattern was organized. The crest of the wave was typically located downstream from the generating complex site. This implies an upward wind movement at the site during a stationary wave condition. There was also an indication of vertical motion of winds from the south, probably the result of a slight upslope flow in southerly winds. Other observed vertical motion was associated with turbulent mixing from solar heating.

In the report on the tracking of constant volume balloons at the Emery plant site (Sutherland, 1974), it was indicated that several balloons were observed to have sunk to the ground during light westerly flows. Such a condition could lead to plume subsidence, with downward vertical motion. There was no evidence from other vertical motion measurements made to indicate that the phenomenon was more than an infrequent occurrence. Similar conditions were found during later tracer tests (Anderson, 1975).

b. Atmospheric Stability and Dispersion Potential

Atmospheric stability is a function of temperature change with increasing height above ground. This change results in stable, neutral, or unstable conditions. Stable atmospheric conditions occur when temperature increases with height resulting in suppression of both vertical air movement and vertical dispersion of emissions. Unstable atmospheric conditions are characterized by a temperature decrease with height, marked vertical mixing of air, and rapid dispersion of air pollutants. Neutral conditions are characterized by a temperature decrease with height usually associated with moderate to strong winds, which retard plume rise. Neutral atmospheric conditions occur quite frequently. Atmospheric structure and stack emission behavior as it relates to typical plume patterns under stable, neutral, unstable fumigation, and inversion conditions are described in Appendix V-1.

Measurements of thermal structure, using Atomic Energy Commission (AEC) Pasquill stability conditions, at the Emery site (made between October 1972 and November 1973) indicate that morning atmospheric conditions in the lowest 500 meters (1,600 feet) were slightly stable to neutral 75 percent of the time. Conditions in the lowest 200 meters (650 feet) were stable 15 percent of the time (Table 2-1). In the afternoon, neutral atmospheric conditions prevailed about 80 percent of the time (Table 2-2). In the lowest 500 meters, surface based inversions occurred about 50 percent of the time in the mornings and about 10 percent of the time in the afternoons. More restrictive atmospheric conditions, including pollution trapping (limited mixing), exist during fall and winter.

These conditions are created by elevated inversions at 300 to

TABLE 2-1

Morning Atmospheric Stability Soundings
(Oct 1972 - Nov 1973)

Height Above Ground Level (m)	Relative Frequency of AEC Pasquill Stabilities in 100 Meter Layers[a]						
	Very Unstable	Moderately Unstable	Slightly Unstable	Neutral	Slightly Stable	Moderately Stable	Very Stable
500	0	1	0	45	53	0	1
[b]400	0	0	0	36	61	3	0
300	0	1	0	26	67	6	0
200	0	0	0	27	58	12	3
100	1	0	0	28	45	20	6

[a]Total soundings 115, number of inversions 59.

[b]Expected plume height.

TABLE 2-2

Afternoon Atmospheric Stability Soundings
(Oct 1972-Nov 1973)

Height Above Ground Level (m)	Relative Frequency of AEC Pasquill Stabilities in 100 Meter Layers[a]						
	Very Unstable	Moderately Unstable	Sightly Unstable	Neutral	Slightly Stable	Moderately Stable	Very Stable
500	0	0	0	80	19	1	0
[b]400	0	0	0	76	20	2	2
300	0	0	0	78	20	2	0
200	0	0	1	82	17	0	0
100	2	0	2	75	19	2	0

[a] Total Soundings 111, number of inversions 12

[b] Expected plume height.

750 meters (900 to 2,250 feet) above the ground and occur about 10 percent of the time in the area of the proposed site.

c. Existing Air Quality

Air quality measurements have been made in the area of the proposed Emery generating complex site since 1970 by the Utah Engineering Experiment Station, University of Utah (UP&L, 1973), and more recently, by the Environmental Studies Laboratory, Research Institute, University of Utah (UURI, 1975; 1976). Measurements taken at Huntington City and Huntington Canyon in 1970 and 1971 reflected low levels of pollutants. The low concentration of pollution was the result of low human population density and activity, and a general lack of large numbers of pollution sources in the area. (See Appendix V-2 for federal and State of Utah Emission and Ambient Air Quality Standards.)

The average concentrations of pollutants during 1970 and 1971, and a comparison with National Ambient Air Quality Standards (NAAQS) are shown in Table 2-3. Although average particulate concentrations were well within standard limitations, the standards were exceeded periodically by particulates being suspended during strong wind conditions. The primary NAAQS (for protection of human health) was exceeded 16 times in 1,222 daily measurements, and the secondary standard (for protection of welfare) exceeded 51 times in 1,200 measurements (about 4 percent of the time). Additional measurements were made during July and December of 1974 and in January, 1975, at locations shown in Figure 2-4.

Background sulfur dioxide (SO_2) levels averaged 0.0005 to 0.001 parts per million (p/m), based on measurements taken in July, 1974, around the plant site in Huntington Canyon. The average increase

TABLE 2-3

Pollutant Concentrations in
Huntington, Utah Area Versus Applicable Standards
(Measurements made in 1970 and 1971)

Pollutant	National Standards[a]	Average Concentration	Percent of Standard
Sulfur Dioxide			
24-hour maximum	0.14 p/m (P)	0.005 p/m[b]	3
Annual average	0.03 p/m (P)	0.005 p/m	16
Nitrogen Oxide	0.05 p/m (P)	0.007-0.021 p/m	14-42
Particulates			
24-hour maximum	150.0 μg/m^3(S)	66 μg/m^3 (Huntington City)	44
Annual average	60.0 μg/m^3(S)	12-22 μg/m^3	20-37
Ozone			
1-hour maximum	0.08 p/m (P)	0.22-0.04 p/m	25-50

[a]National Ambient Air Quality Standards: (P) primary, (S) secondary; Title 40 Code of Federal Regulations Part 50. Federal regulations are quoted in the Utah regulations with the exception of regulations for sulfur dioxide.

[b]Threshhold of Detection.

in the 24-hour concentration of SO_2 at 2 miles up the canyon from the Huntington power plant was estimated to be 0.005 p/m after the plant began operation. During the winter, the SO_2 concentration in the small towns in the area averaged about 0.003 to 0.004 p/m, which is approximately 10 percent of the annual standard for SO_2. The 24-hour average total nitrogen oxide (NO_x) concentration at Bear Creek, 2 miles up-canyon from the plant, increased from 0.001 p/m to 0.007 p/m after the plant began operation. Concentrations in the small towns averaged 0.004 to 0.01 p/m, which is 8 to 20 percent of the annual NO_x standard.

The annual average particulate concentration at Huntington City during 1974 was 89.4 micrograms per cubic meter ($\mu g/m^3$) (plus or minus 7.0 $\mu g/m^3$) which is approximately 120 percent of the primary standard.

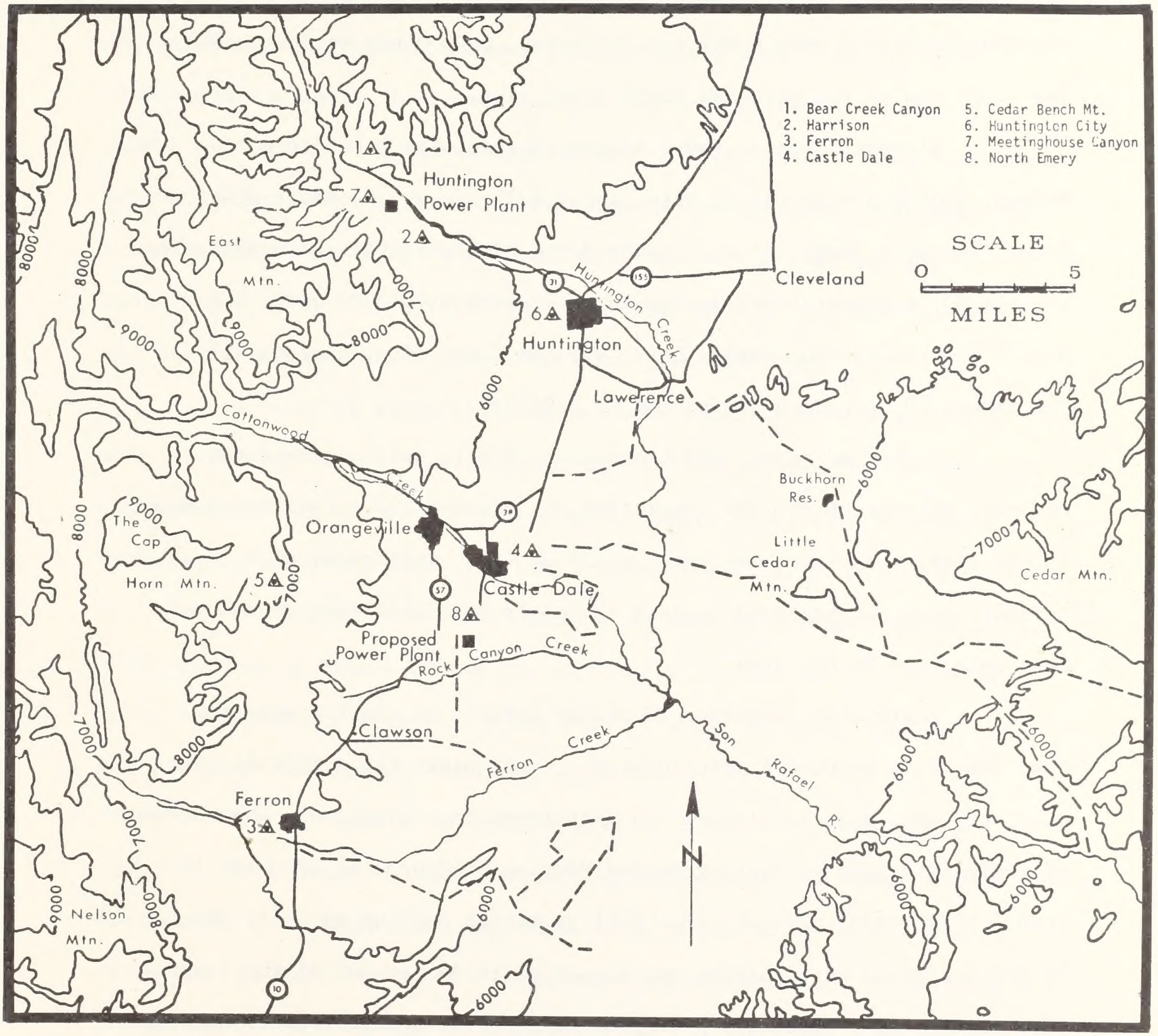
The primary ambient air quality 24-hour standard (260 $\mu g/m^3$) was exceeded six times, and the secondary 24-hour standard was exceeded 48 times.

The annual primary NAAQS was exceeded every month except January. Wind data indicated strong winds during these periods and precipitation was approximately one-third that of 1973.

Analysis of the particulate components (soil dust, fly ash, sulfate, and soot) indicated the high particulate concentrations were due to wind-blown soil dust and not fly ash from the Huntington plant, which accounted for less than 1 percent of the total.

Studies were conducted in the vicinity of the proposed Emery generating complex site during 1974 to determine the background concentration of particulates and pollutant gases (UURI, 1976). The sampling sites included one permanent site 1 mile north of the proposed power generating complex, and three temporary sites at Castle Dale, Ferron, and Cedar Bench Mountain (Figure 2-4).

The average monthly concentration of particulates measured at the site from July through September, 1974, was 25.7 $\mu g/m^3$ compared with the annual primary standard of 75 $\mu g/m^3$. The highest monthly average was 45 $\mu g/m^3$ in August and the lowest was 12 $\mu g/m^3$ in December. Soil dust contributed approximately 90 percent of the total mass; fly ash, 7 percent; sulfate, 2 percent; and soot, less than 1 percent. Samples taken at the other sites during July and December of 1974 ranged from 74 $\mu g/m^3$ at Ferron to 14 $\mu g/m^3$ at the remote Cedar Bench Mountain site.



Source: UURI, 1976

FIGURE 2-4

SAMPLING SITE LOCATIONS

The SO_2 and NO_x gases were measured during 2-week periods in July and December. Average SO_2 concentrations during July at all locations were at the threshold of the measuring equipment. During December, the SO_2 concentrations were 0.002 p/m at Ferron, 0.0033 p/m at Castle Dale, and 0.001 p/m at the proposed Emery plant site.

Nitrogen dioxide (NO_2) concentrations were 0.0035 p/m at Ferron, 0.0044 p/m at Castle Dale, and 0.0013 p/m at the Emery plant site. The more remote area of Cedar Bench Mountain averaged 0.0011 p/m. Average NO_2 concentrations during December were 0.0044, 0.0089, and 0.0026 p/m for Ferron, Castle Dale, and the plant site, respectively. The annual NO_2 standard limitation is 0.05 p/m.

Carbon monoxide, and hydrocarbon levels were not measured. However, because of the low population and limited industrial development in the area, such levels expected would be low. Photochemical oxidants were not measured because there are no significant sources of this pollutant in the area.

Visibility reduction is caused largely by light scattering resulting from suspended particulates. Particulate types include soil dust, fly ash, soot particles, and nitrate-sulfate particles. Measurements of visibility made in Huntington and Huntington Canyon in 1970 and 1971 (USDI, USBR, 1975) indicate that soil particles made up 96 to 97 percent of the suspended particulates and caused 63 to 69 percent of the light scattering. Soot (probably from coal burning for domestic heat) caused 14 to 31 percent of the light scattering. Nitrate-sulfate particles (from the conversion of SO_2 and NO_x gases to particulates) caused 3 to 14 percent of the light scattering. Fly ash particles contributed 1.3 to 2.3 percent of the suspended particles and caused 3.3 to 3.5 percent

of the light scattering.

Visual distance, determined from the town of Huntington, calculated from light scattered measurement made with an integrating nephelometer, averaged 67 miles for measurements made from September, 1970 to March, 1971. Measurements included data gathered during the winter when smoke from the burning of coal for domestic heating contributed to particulates in the air. The nephelometer measurements represent the visual distance as if all air in the area was of the same quality as that in the town. The studies were continued during 1973 and 1974 in the area of Huntington City and Huntington Canyon (UURI, 1976).

Visibility evaluation studies were begun in 1974 at a site 1 mile south of Clawson, Utah, (approximately 5 miles south of the proposed plant site). For the period August to December, 1974, visual range calculated from particulate sampling varied from 50 to 83 miles, with an average of 71.5 plus or minus 11 miles. An automatic camera was used to record landmarks viewed toward the north at distances of 1 to 50 miles. These landmarks are judged as being clearly visible, partly visible, or not visible. Results are shown in Table 2-4.

Obstructions to visibility were recorded as clouds, rain, snow, or haze. Reduced visibility of landmarks from 5 to 20 miles was due largely to clouds, rain, and snow, with little or no haze. Reduced visibility in the 5 to 20 mile range occurred approximately 10 percent of the time. This was due to cloudiness half of the time, rain or snow the remaining half. Reduced visibility at the 50-mile distance occurred 51 percent of the time with haze defined as the cause in 60 percent of the cases. The study concluded that the haze was the result of domestic activity along Highway 50 and in the cities of Price and Helper, and

commercial activity by railroads, mines, and coal handling operations. The study concluded, ". . . On the basis of the data, the emissions from the Huntington Canyon Power Plant had no significant effect on visibility during the sampling period. Before possible impacts of power plant emissions on visibility can be finally determined, it will be necessary to sample under highly stable conditions and at the highest relative humidities."

TABLE 2-4

Visibility Reduction in Emery Plant Area

Distance to Landmarks (mi)	Percent of Time Reduced Visibility Occurred[a]	Cause of Reduced Visibility (%)			
		Clouds	Rain	Snow	Haze
1	1.7	50	25	25	0
5	8.3	40	30	25	5
13	11.6	54	23	23	0
20	10.3	44	32	24	0
50	51.0	30	2	8	60

Source: UURI, 1976b.

[a]Reduced visibility, either partly or completely obscurred

3. Geology and Topography

a. General

Central Utah contains a number of diverse and prominent topographic features. The most prominent are the high plateaus, especially the Wasatch Plateau, and the front range of the Wasatch Mountains. Both the

Wasatch Plateau and the range exceed 10,000 feet in elevation. To the east of the plateau and west of the front range are a number of valleys - Castle, Utah, Goshen, Cedar, Sevier, and Gunnison - which are characterized by relatively flat terrain, alluvial plains, benches, knolls, and rolling hills. The elevations of these valleys range from 4,500 to 6,000 feet.

Figure 2-5 is a physiographic map of the Carbon-Emery County area of east-central Utah.

b. Specific

Stream dissection has created a southward pointing finger of the Wasatch Plateau (East Mountain) under which lies the Wilberg Mine (Figure 2-6). East Mountain consists of sedimentary strata dipping at about a 5 degree angle to the west. Surface topography ranges from an elevation of 7,250 feet to about 9,600 feet within the Wilberg Mine leasehold area. Figure 2-6 shows the topography at the Wilberg and Deer Creek coal leases. Both the Hiawatha and Bear Canyon Coal Seams are located in the Black Hawk formation. The Bear Canyon Seam is 120 to 140 feet above the Hiawatha Seam in the Wilberg Mine lease area.

The formations above the mine - from mine to surface - (Stokes and Cohenour, 1956) include:

<u>Blackhawk Formation</u> - approximately 1,000 feet of interbedded sandstone, shale and coal.

<u>Price River Formation</u> - approximately 300 feet of sandstone (including the massive, cliff-forming Castlegate Sandstone Member) with some interbedded shales.

<u>North Horn Formation</u> - approximately 600 feet of interbedded sandstone and shale.

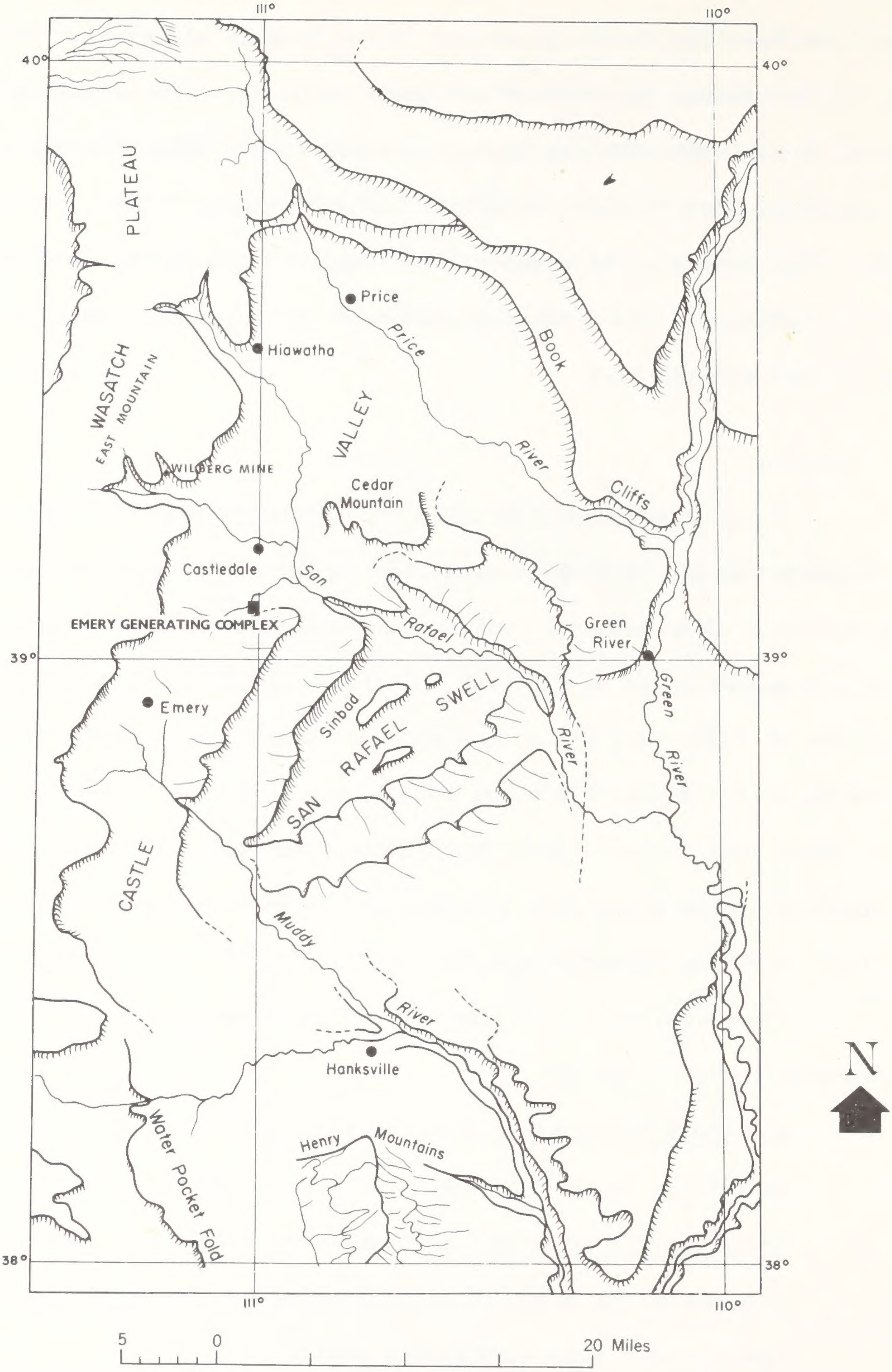


FIGURE 2-5

PHYSIOGRAPHY OF EMERY PROJECT AREA

R.6 E.

R.7 E.

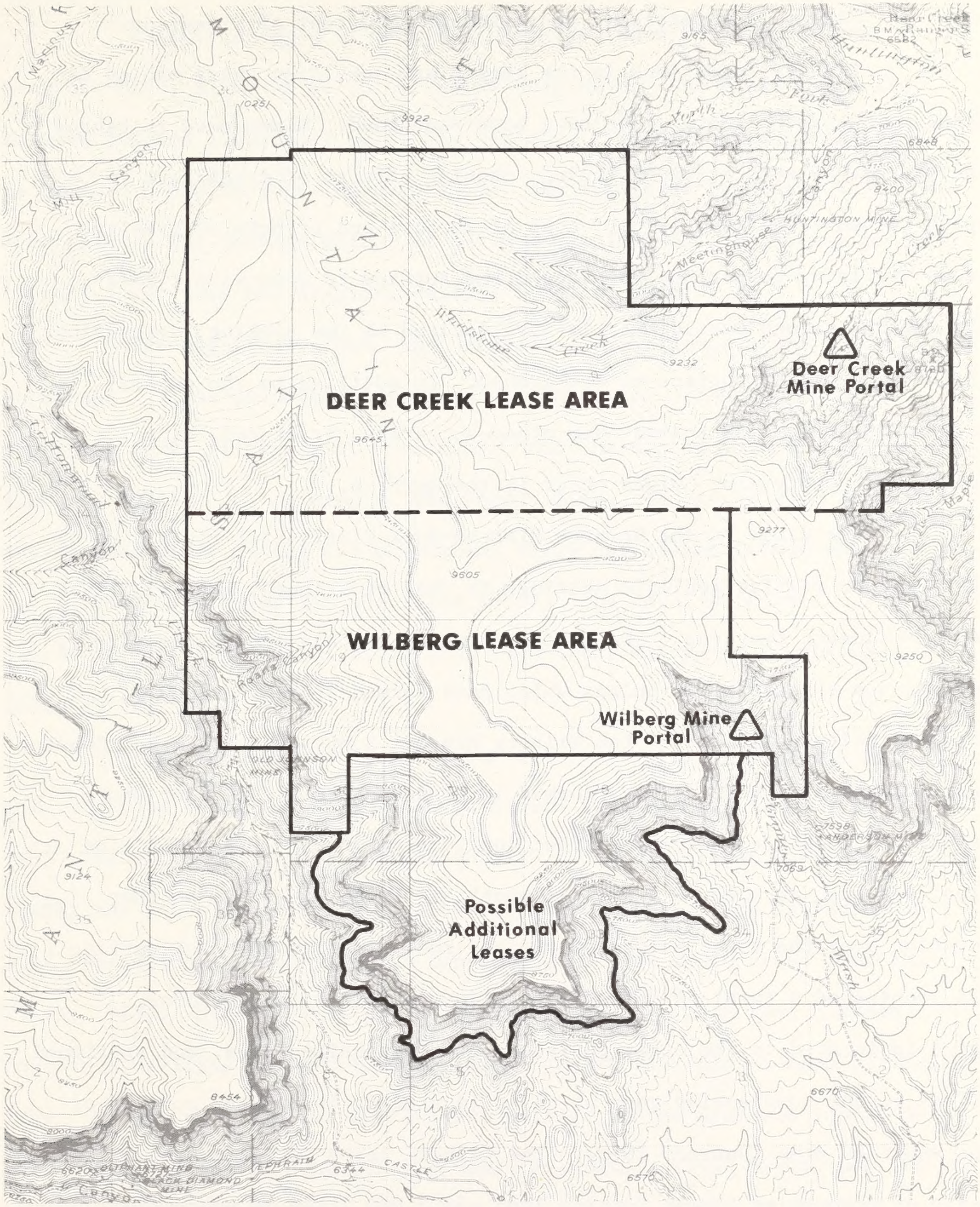


FIGURE 2-6

SURFACE TOPOGRAPHY IN THE WILBERG AND DEER CREEK MINE LEASE AREAS

Flagstaff Formation - approximately 150 feet of limestone.

Similar formations in the region are subsiding where mining is being conducted or where mines have been abandoned. Mines cave in behind the retreat at completion of mining, causing effects of subsidence to reach the surface (NAS, 1975). Loss of support and effects of gravity cause overlying formations to sag and the surface to down-warp. This phenomenon, termed subsidence, is also defined as the sinking, descending, or lowering of the surface of the ground. In addition to the general depressions which are formed over mined-out areas, fractures, sink-holes, and compression bulges occur in the surface.

Two mines in the Wasatch Plateau-Book Cliffs coal fields, which are in similar geologic settings to that of Wilberg, have exhibited such subsidence features. The most pronounced surface subsidence effects are tension fractures and bulges which have formed above the Geneva Mine, 45 miles northeast of the Wilberg Mine at Sunnyside, in Carbon County. Nearly vertical fractures have formed in sandstone about 900 feet above the mine. Some are hundreds of feet long, reach down to the caved mine area, and open as much as 3 feet in width at the surface. In another location over the mine, bulges of surface rock have formed. The surface was lengthened a total of 5 feet, as evidenced by the tension zone, which is located in the outer periphery of the subsided area, and shortened 3 feet in the compression zone which is located in the center portion of the subsided area (Dunrud, 1975). The Wilberg lease is located on 2,578 acres of unoccupied Forest Service land and 2,080 acres of unoccupied private land. There are no stipulations in the existing coal lease to control or mitigate subsidence from the mine.

Another example of subsidence can be found above the Winter Quarters Mine, 25 miles north of the Wilberg Mine. The mined areas are between 500 and 1,000 feet below the surface. The coal seam thickness is between 6 and 20 feet (Alvord, 1975). An irregular depression has developed on the surface which, at maximum displacement, is approximately 15 feet lower than the original surface (Travis, 1976).

The magnitude, rate, and duration of subsidence are difficult to assess. These phenomena depend on thickness and strength of the overlying rock, thickness of coal mined, and the mining methods used (Dunrud, 1975). In the case of the Geneva Mine, the cracks were formed only months after mining was completed, while the bulges formed about 1.5 years after mining was completed 1975). The total effects of subsidence are not evident until some time after mining is completed (NAS, 1975).

Some areas are unstable along the Emery-Spanish Fork Canyon-Camp Williams and Emery-Salina Canyon-Sigurd transmission lines (VTN, 1975; Tew and Olson, 1975; Schroder, 1971). The U.S. Forest Service (USFS) has set a landslide stability rating for most of the unstable land over which the Emery-Salina Canyon-Sigurd line would cross (Tew and Olson, 1975). Stability is rated in four classes. These same classes have been utilized to describe the Emery-Spanish Fork Canyon-Camp Williams line. Table 2-5 gives the approximate mileage of the proposed lines in each stability class. The profile maps (Appendices VI-4, VI-5) show the location of these areas.

TABLE 2-5

Landslide Stability of Proposed Transmission Lines

Transmission Line	Distance of Indicated Stability[a] (mi)			
	1	2	3	4
Emery-Spanish Fork Canyon-Camp Williams	78	26	3	11
Emery-Salina Canyon-Sigurd	43	13	5	2

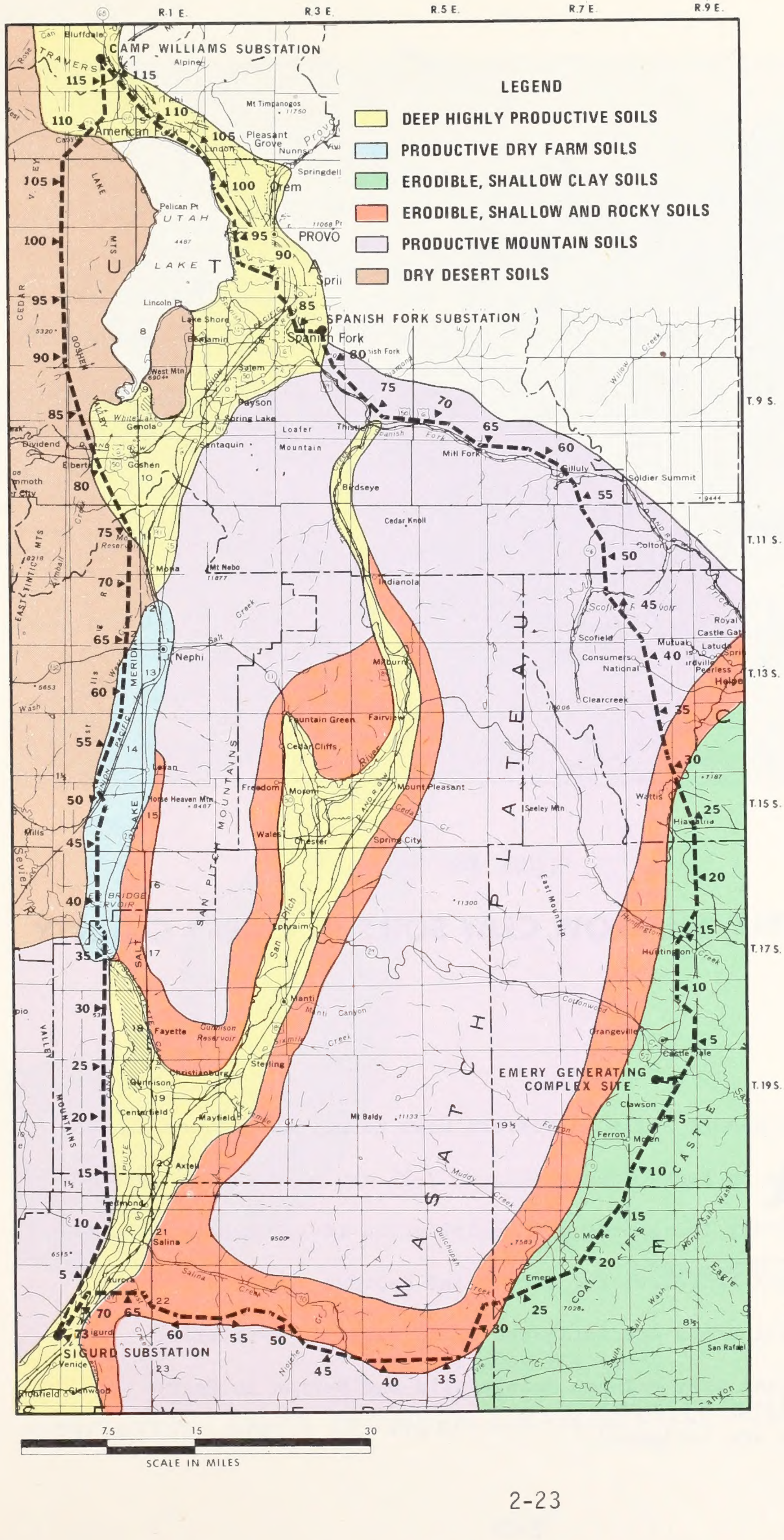
[a]Stability classes in terms of landslides:
1. Stable.
2. Moderately unstable. Small movement, low risk of landslides.
3. Moderately unstable. Evidence of past slides, moderate to high risk of landslides.
4. Unstable. Recent or continuing extensive land movements, high risk of landslides.

4. Soils

a. General

The soils in the area of the proposed project range from deep, highly productive soils, irrigated by snow-fed streams in Utah and Sevier counties, to erodible, shallow, and rocky soils (badlands) used mainly for livestock grazing and wildlife habitat in Carbon, Sevier, Sanpete, and Emery counties (Figure 2-7). Control of soil loss and the resultant heavy sediment production is a major problem in the "badland" areas.

Dry farm soils are found in Juab County where precipitation (12 to 14 inches) is sufficient for production of winter wheat. Productive mountain soils can be found in Sevier, Carbon, and Sanpete counties which also receive upwards of 13 inches of precipitation annually. Mountain soils are suitable for production of forage, wildlife habitat, and wood products. Since these soils are the major water yielding areas of the region, care must be exercised to protect the surface layers.



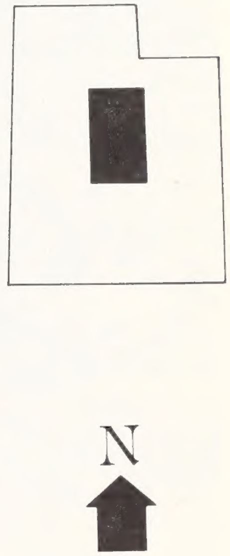


FIGURE 2-7

SOILS OF CENTRAL UTAH

FIGURE 2-8

TYPICAL ERODIBLE, SHALLOW, CLAY SOILS IN EMERY COUNTY

The dry, desert soils in western Utah County and the erodible, shallow, clay soils in Emery County (Figure 2-8) are alkaline in nature, receiving a relatively low amount of precipitation (8-11 inches). These soils mainly support rangeland for cattle and habitat for wildlife.

Some small areas are irrigated where water is available. Figure 2-9 shows that area between Orangeville and Ferron in Emery County where soils are irrigated.

FIGURE 2-9

IRRIGATED LANDS BETWEEN ORANGEVILLE AND FERRON, UTAH

Soil description in this section is limited to two physical properties - erosion hazard and percent probability of success of normal range land seeding. The term erosion hazard describes the susceptibility of a soil to erosion, or the wearing away of the land surface (USBR, 1975). Soils are rated as having a low, moderate, or high erosion hazard. The erosion hazard was determined using the sediment yield per square mile per year. A low erosion hazard was equal to a sediment yield of less than 800 tons. A moderate erosion hazard was equal to a sediment loss of between 800 to 1,600 tons, and a high erosion hazard equaled a loss of greater than 1,600 tons.

The percent probability of success for range land seeding is intended to be a relative rating of successful seeding establishments, after disturbance, that might be expected during a given period of years (USBR, 1975). For instance, if the percent probability for successful seeding was less than 30 percent, then one could expect successful seeding establishment less than 3 out of every 10 years.

b. Specific

The acreage of soils in terms of erosion hazard and percent probability of success for range land seeding are listed for each project component (Tables 2-6, 2-7). Site specific profile maps (Appendix VI-1 through VI-5) show the location of these two soil properties along the proposed coal haul road, water pipe line, and transmission line corridors.

Generating complex soils are comparatively high in soluble salts, averaging approximately 6 tons per acre or 3,000 p/m.

TABLE 2-6

Erosion Hazard in Project Component Areas

Project Component	Erosion Hazard (acre)		
	Low	Moderate	High
Generating complex	0	1,000	1,000
Coal source and surface facilities	0	0	100
Coal haul road	0	19	20
Water system - pipe line	0	6	27
Transmission Lines			
Emery-Spanish Fork Canyon-Camp Williams	637	706	473
Emery-Salina Canyon-Sigurd	126	622	245
Sigurd-Camp Williams	316	1,544	0

TABLE 2-7

Probability of Success for Rangeland Seeding

Project Component	Probability of Success (acre)			
	Less than 30%	30-50%	50-70%	More than 70%
Generating complex	2,000	0	0	0
Coal source and surface facilities	100	0	0	0
Coal haul road	29	0	10	0
Water system-pipe line	27	0	6	0
Transmission Lines				
Emery-Spanish Fork Canyon-Camp Williams	577	0	95	1,144
Emery-Salina Canyon-Sigurd	576	0	103	314
Sigurd-Camp Williams	32	268	1,260	300

5. Vegetation

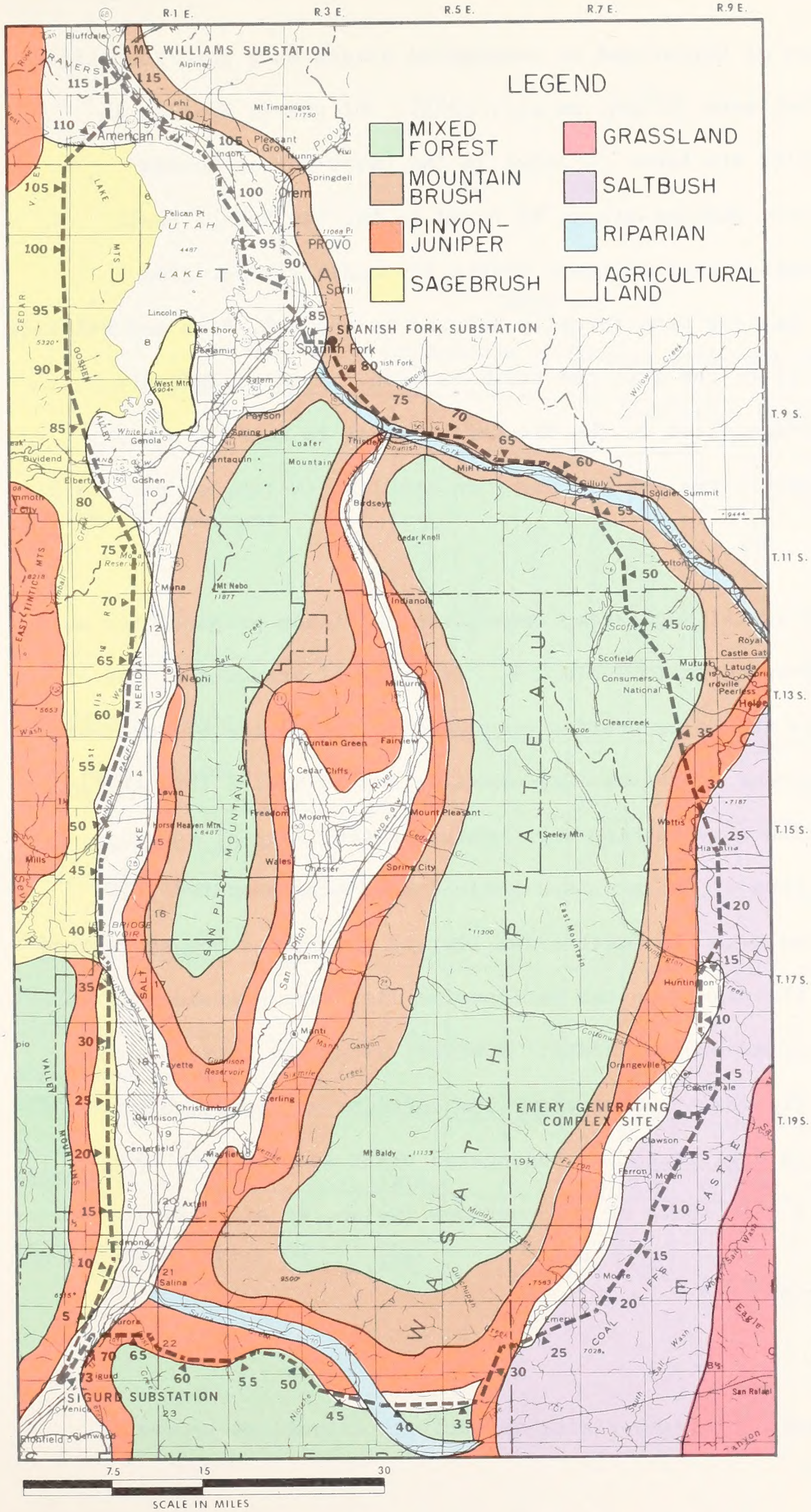
a. General

The area encompassing the proposed project facilities has a variety of environmental characteristics including a large number of vegetative communities typical of central Utah (Foster, 1968). The more important factors for maintaining these communities are water availability and soil composition. The complexity and diversity of these communities change as moisture availability changes from the valley floor to plateau tops. Because of the plateau elevation there is an uplifting effect on incoming air mass systems (Hill, et al., 1974). Thus, the plateaus receive more precipitation than the surrounding valleys.

Vegetative communities range from saltbush and sagebrush in the valley bottoms to Englemann spruce and subalpine firs on the plateau tops. Included within this range are saltbush, sagebrush, grassland, saltgrass, greasewood, mountain brush, pinyon-juniper, aspen, mixed conifer, and riparian plant communities (VTN, 1975) (Figure 2-10). A list of major vegetative species for each community appears in Appendix VII-1.

Since early pioneer days the vegetative resources, in the valley bottoms especially, have been removed for agricultural purposes or utilized for livestock grazing.

The Endangered Species Act of 1973 required publication of a list of threatened and endangered plants that are of aesthetic, educational, historical, recreational, or scientific value to the nation. This list was prepared by the Smithsonian Institute and appeared in the Federal Register (Volume 40, Number 127, Tuesday, July 1, 1975).



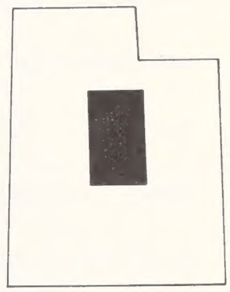


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FIGURE 2-10

VEGETATION OF CENTRAL UTAH

Thirty-one species of threatened or endangered plants have been identified in the central Utah area (Welsh, et al., 1975). Of the 31 species in the area, 15 species are known to occur in the Emery-Carbon County area. Most of these species are to be found in the San Rafael Swell located in the central part of Emery County (Appendix VII-2). The Smithsonian list has not been formally adopted by the U.S. Fish and Wildlife Service. Additions to the list can still be made. Studies indicate that 12 other species occur on the San Rafael Swell in Emery County, which should be considered for placement on the list (Welsh, et al., 1975).

b. Specific

The acreage of vegetative communities on lands proposed for each project component is shown in Table 2-8. Figure 2-11 presents a view of typical vegetation at the generating complex site. Location of vegetation types along the linear components are shown in Appendix VI-1 through VI-5.

Vegetative surveys have been conducted and lists of known species for each area of the proposed project have been prepared (VTN, 1975a) and compared with the Smithsonian list of threatened and endangered plants. None of the plants on the Smithsonian list have been identified in any of the proposed project areas. However, along the Emery-Spanish Fork Canyon-Camp Williams transmission line corridor at Clear Creek (mile 60), *Phacelia argillacea*, an endangered plant species, has been collected 0.5 to 1 mile south of the corridor (Welsh, et al., 1975).

6. Water Resources

a. General

The Wasatch Plateau, rising abruptly to elevations exceeding

TABLE 2-8

Vegetative Communities in Project Component Areas

Project Component	Vegetative Communities (acre)											
	Agricultural	Aspen	Grassland	Greasewood	Mixed Conifer	Mountain Brush	Pinyon-Juniper	Saltbush	Saltgrass	Sagebrush	Riparian	Annuals
Generating Complex	800			320				780			100	
UP&L Land Outside Complex	800			156				343	66		65	
Coal Source & Surface Facilities							100					
Coal Haul Road	30			6				3				
Millsite Reservoir Pipe Line	12			6				11	3		1	
Emery-Spanish Fork Canyon-Camp Williams T/L	431	110	67	16	31	315	315	158		296	77	
Emery-Salina Canyon-Sigurd T/L	116			32	130	32	154	309		157	63	
Sigurd-Camp Williams T/L	284			32	205		79			1,134		126

FIGURE 2-11

TYPICAL VEGETATION AT THE GENERATING COMPLEX SITE

10,000 feet, is the major source of water for central Utah (Jeppson, 1968). Precipitation mostly in the form of snow averages more than 20 inches annually. Streams from the plateau (Figure 2-12) are typically snow-fed, therefore, fluctuation of runoff rates is great. Streams are highest during late spring and early summer, decreasing to a minimum flow in early autumn through mid-winter. Numerous springs discharging from limestone and sandstone formations also feed the streams. The streams above canyon mouths are rated high in water hardness and dissolved

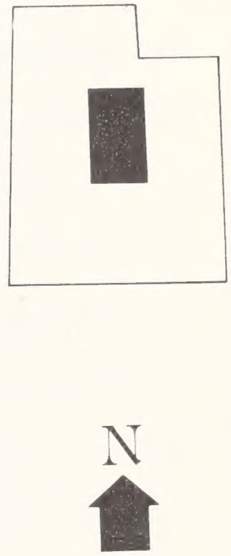


FIGURE 2-12

MAJOR WATER RESOURCES OF CENTRAL UTAH

oxygen and relatively low in dissolved salts. Water quality is good.

Below canyon mouths, the hardness, alkalinity, and dissolved solids increase and the streams become more turbid. This decrease in water quality is a result of higher sediment loads, including salts. The salinity increases as the water evaporates while passing over the soluble marine shales and as it picks up fertilizer residue and drain water from farm lands (Millar, 1975).

Most waters in central Utah were appropriated for irrigation early in the history of the State. The majority of appropriations were developed within the governing rules of several irrigation companies organized by consolidated water users. Water shares were subsequently issued to all consolidated holders, each share providing for an equivalent right to the use of a quota of water (USBR, 1961). Water to be used at the Emery plant has thus been appropriated through diligence and water right, and would not affect the Colorado River compact (Utah State Division of Water Rights, 1976).

Regional waters are used principally for agricultural (irrigation and livestock), industrial, and domestic purposes. Water is used nonconsumptively for fish, wildlife, and recreation.

Reservoirs have been constructed on the Huntington, Cottonwood, and Ferron creeks. These streams lie within a watershed covering 927 square miles within the larger San Rafael watershed comprising 1,960 square miles (Iorns, 1965). Figure 2-13 shows the location of major streams and reservoirs in Emery County in relation to the project. Table 2-9 indicates current water demands on Ferron, Cottonwood, and Huntington Creek drainages (VTN, 1975).

Emery County, Utah, has 46,295 acres of irrigated cropland

FIGURE 2-13

LOCATION OF MAJOR STREAMS AND RESERVOIRS IN EMERY COUNTY

representing 1.6 percent of the county gross area (Utah State Department of Agriculture, 1974). The Emery County Irrigation Project provided for diversion of 19,000 acre-feet of water annually (average amount) from the Cottonwood Creek Basin into the Huntington Creek Basin. The diversion is through the Cottonwood Creek-Huntington Canal. The water is stored at the Huntington North Reservoir (Figure 2-13).

TABLE 2-9

Current Water Use for Ferron, Cottonwood, and Huntington Creek Drainages

Water Demand[a]	Water Use (acre-ft/yr)		
	Ferron Creek	Cottonwood Creek	Huntington Creek
Industrial	[b]7,000	0	15,000
Agricultural	16,800	32,000	92,000
Domestic	129	354	223

Source: VTN, 1975

[a]Values are an annual average.

[b]Current use is agricultural, future use may be industrial.

Quality and quantity of ground water in the area are extremely variable. Beneficial use of the poor quality ground waters in Castle Valley has been limited to a few shallow wells developed for livestock watering. Higher quality spring water from the Wasatch Plateau has been used as culinary water (Millar, 1975).

b. Specific

(1) Generating Complex

Rock Canyon Creek, a lower tributary of Cottonwood Creek, passes near the power generating complex site. High intensity thunderstorms and irrigation return flows provide its water source. This creek is relatively high in total dissolved solids (1,200 milligrams per liter) due to irrigational returns and interaction with saline bed and bank sediments.

Ground water is also highly saline. Refer to Appendix VIII for a detailed analysis of ground water at the generating complex site.

(2) Coal Source

Six measured springs, tributaries to Grimes Wash, are located directly over the Wilberg Mine (Figure 2-14). These springs produce about 160 acre-feet per year, total flow. Three springs also located directly over the mine, but tributaries to Cottonwood Creek, produce about 20 acre-feet per year. In addition, there are two small lakes on East Mountain over the mine. These springs and lakes are utilized for livestock and culinary purposes. There are also many springs in the area feeding into Deer and Cottonwood creeks (Figure 2-14). The flow rates of some of these springs have been measured, but many of the springs have not been fully investigated (USFS, 1976).

(3) Water Systems

Millsite Reservoir, located on Ferron Creek, was constructed in 1971 with assistance from the Soil Conservation Service. It has a storage capacity of 18,160 acre-feet.

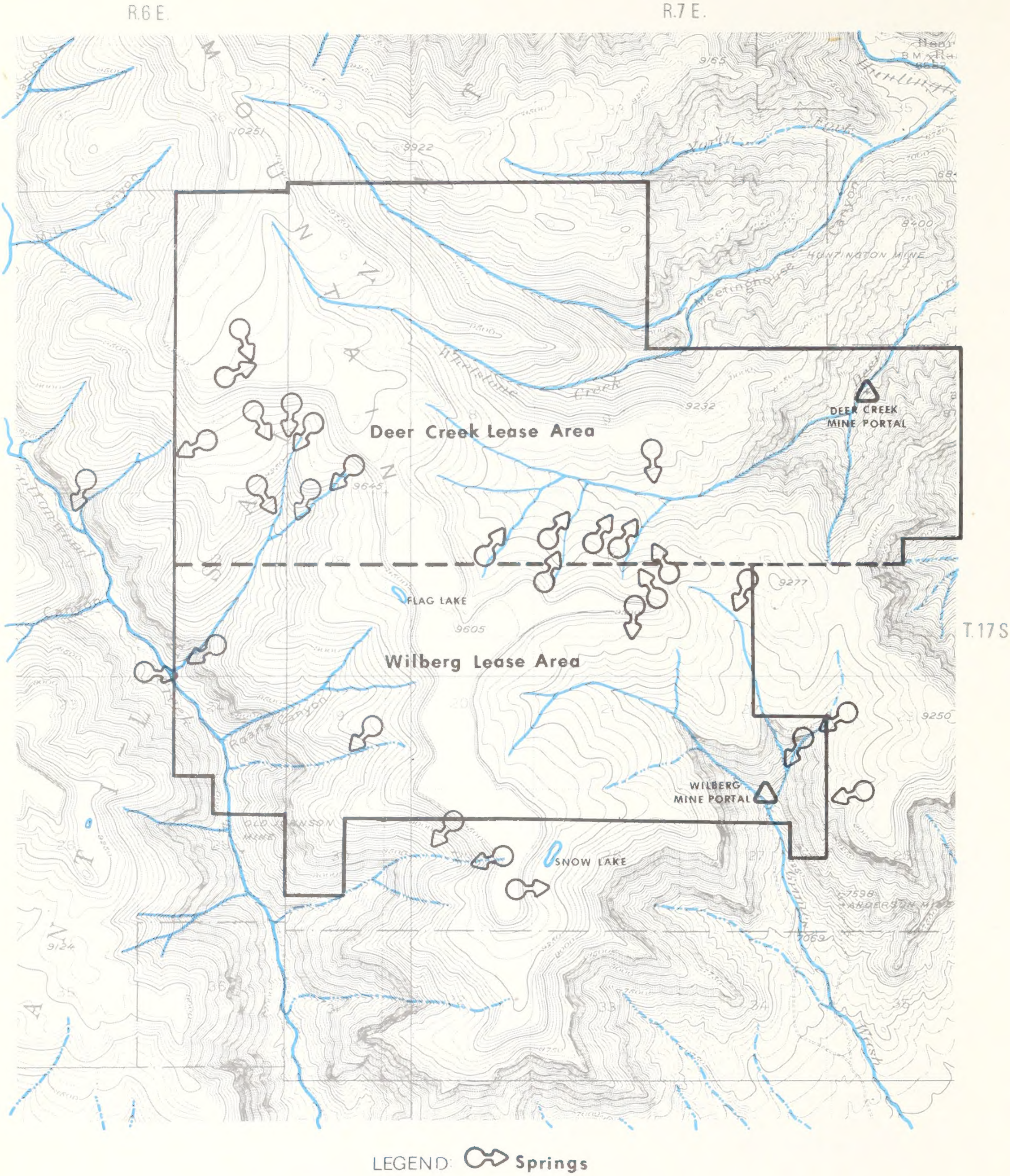


FIGURE 2-14

SURFACE WATER RESOURCES IN THE WILBERG AND DEER CREEK MINE AREAS

Annual water demands from Ferron Creek for agricultural purposes are 23,800 acre-feet.

(4) Transmission Lines

Major streams that may be crossed by, or immediately adjacent to, the power transmission lines are summarized in Table 2-10 (USDI, USBR, 1975). About one-half of these streams have very low or intermittent flows. The Provo and Jordon rivers are largest; the Price, Spanish Fork, and Sevier rivers and Huntington and Cottonwood creeks also have significant year long flows. Appendix VI-3 through VI-5 show locations of the measurable streams.

7. Wildlife

a. General

(1) Aquatic

Major reservoirs in the central Utah region, located mainly in Carbon and Emery counties, are Joes Valley, Scofield, Huntington North, Millsite, Electric Lake, Gooseberry, Cleveland, Miller Flat, Duck Fork, Willow Lake, and Ferron. Locations of these reservoirs and major streams are shown in Figure 2-12. (At present, the Duck Fork Reservoir is dewatered, but within 2 years the reservoir will be raised to U.S. Forest Service standards and become a fishery.)

The first four reservoirs are located in the valleys, canyon mouths, and lower foothills (altitude 6,000 to 8,000 feet) and are classed as fair to good fisheries. However, these reservoirs are not self-sustaining game fisheries due to heavy angling pressure and lack of sufficient spawing tributaries. Suckers are present in Joes Valley and

TABLE 2-10

Discharges of Streams Along Transmission Corridors

Transmission Corridor	Stream	Discharge Average (ft^3/s)	Average (acre-ft/yr)	Maximum (ft^3/s)	Maximum (date)	Minimum (ft^3/s)	Minimum (date)
Emery-Spanish Fork Canyon-Camp Williams	Cottonwood Creek	99.4	(71,960)	7,220	(8/1/64)	1.2	(4/8/66)
	Huntington Creek	96.2	(69,560)	2,500	(9/2/30)	2	(11/5/26)
	Beaver Creek	4.08	(2,960)	86	(7/16/67)		no flow
	So. Fork Gordon Creek			No Records Available			
	No. Fork Gordon Creek			No Records Available			
	Price River	59.7	(43,220)	1,060	(5/31/42)		controlled
	Spanish Fork	88.4	(64,050)	1,800	(5/4/52)	9.2	(6/29/61)
	Provo	225.0	(163,000)	2,520	(5/6/52)	0	same year
	Jordan River	354.0	(256,500)	1,410	(6/10/52)		no flow at times
Emery-Salina Canyon Sigurd	Ferron Creek	70.0	(50,320)	4,180	(8/27/52)	1	(11/18/59)
	Muddy Creek	38	(27,530)	3,340	(5/10/72)	no flow	(4/13/11)
	Quitchumpah Creek			No Records Available			
	Salaratus Creek			No Records Available			
	Meadow Creek			No Records Available			
	Yogo Creek			No Records Available			
	Niotche Creek			No Records Available			
	Gooseberry Creek			No Records Available			
	Salina Creek	19.4	(14,060)	1,800	(8/26/70)		no flow at times
	Lost Creek			No Records Available			
	Sevier River (near Sigurd)	95.1	(68,900)	2,400	(5/30/22)		no flow at times
Sigurd-Camp Williams	Sevier River			See Above Entry			
	West Creek			No Records Available			
	Chicken Creek	6.02	(4,360)	268	(8/1/68)	no flow	(2/11/66)

Millsite reservoirs, chubs in Huntington North, and both chubs and carp in Scofield Reservoir. At present these waters are stocked by the Utah Division of Wildlife Resources with rainbow trout fingerlings.

Electric Lake is a deep, cold reservoir with steep sides; the lake is a cutthroat trout water only. Good reproduction for cutthroat trout is obtained from Huntington Creek above the lake. Supplemental stocking with cutthroats has been initiated, but would be discontinued if natural reproduction proves to be adequate.

The other five reservoirs (Gooseberry, Cleveland, Miller Flat, Willow Lake and Ferron) are located in the mountains above 8,000 feet and are all stocked. These reservoirs do not maintain self-sustaining game fisheries due to the lack of adequate tributaries having spawning habitat. Good reproduction occurs in Gooseberry Creek above Gooseberry Reservoir. Rainbow catchables are stocked, however. Both Cleveland and Ferron reservoirs are stocked with rainbow catchables plus fingerlings. Willow Lake is stocked with rainbow catachables, while Miller Flat Reservoir is stocked with rainbow fingerlings.

Major fishing streams in the area are the Price River (Lower Fish Creek), Lowry, Huntington, Ferron, and Cottonwood creeks (locations are shown in 2-12). Downstream fluctuations on these waters (except Lowry Creek) are primarily a result of releases from impoundments.

Irrigation demands deplete water flow in some streams during the spring and summer. Photographs of Cottonwood Creek taken above and below the irrigation diversions (Figures 2-15 and 2-16) show a typical stream found in the area.

Below the canyon mouths, because of geologic formations and irrigational return flows streams increase in hardness, alkalinity,

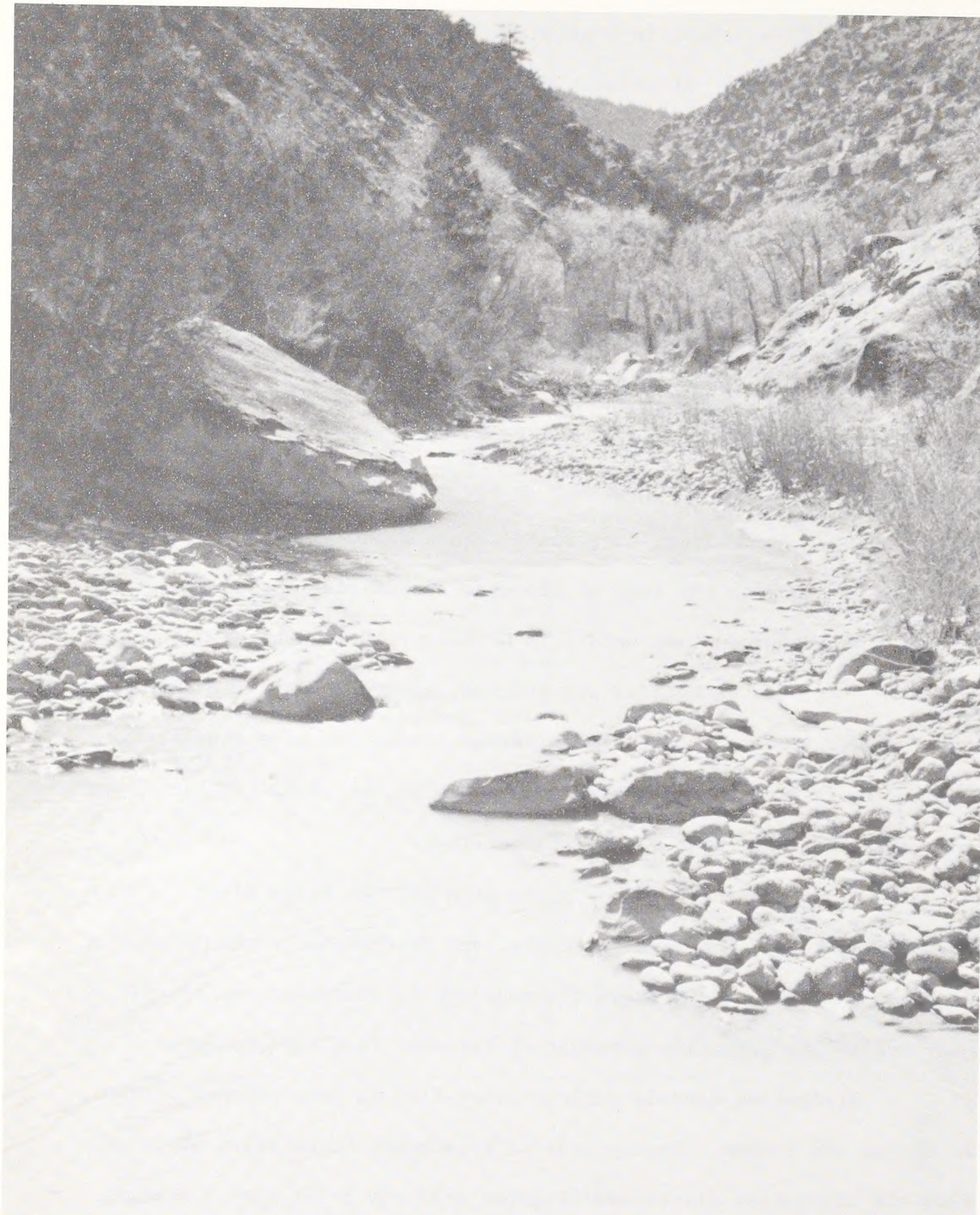


FIGURE 2-15

COTTONWOOD CREEK ABOVE IRRIGATION DIVERSION

FIGURE 2-16

COTTONWOOD CREEK BELOW IRRIGATION DIVERSION

turbidy, and dissolved solids and do not provide habitat for game fish. Above the canyon mouths or irrigation diversion the streams are viable fisheries. However, because of scoured bottoms, and sediment in spawning areas during the spring, (peak runoff periods), and summer and fall (thunderstorms), most streams do not provide self-sustaining fisheries for game fish. However, the upper Price River supports native populations of brown trout. These trout spawn in the fall when the sediment load is low. The trout can maintain adequate population levels under these conditions along with heavy fishing pressure. Cottonwood Creek is stocked with German Brown trout fingerlings, but does not support a self-sustaining population.

Brown Trout fingerlings have been planted for the past three years below Electric Lake due to the inability of the stream to support spawning activities resulting from siltation caused by recent dam and bridge construction.

(2) Terrestrial

Mule deer, elk, American pronghorn antelope, upland game birds, waterfowl, cottontail rabbit, and snowshoe hare are the major game species. Major locations of these animals are shown in Figures 2-17 and 2-18. Cottontail rabbits are found scattered over all the foothills and lower desert areas, whereas snowshoe hares are distributed widely in the mountains. Mountain lion and bear, now classified as game species, are located on the Wasatch Plateau.

Deer and elk summer on the higher elevations of the Wasatch Plateau and winter in the foothills and in the valleys off the plateau. The antelope inhabit a saltbush-grassland type (commonly known as the Icelander Wash

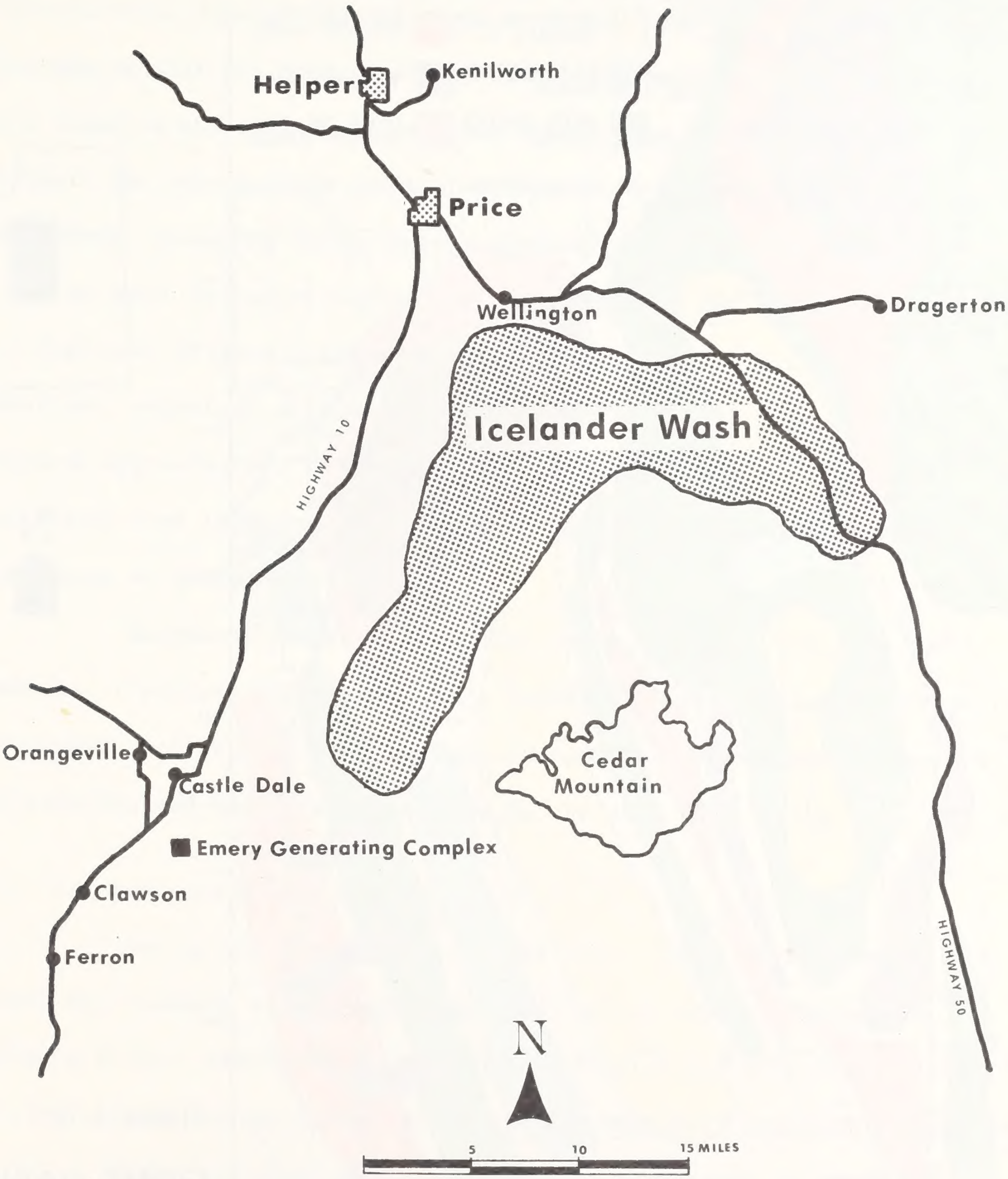


FIGURE 2-17

ICELANDER WASH AREA ANTELOPE RANGE

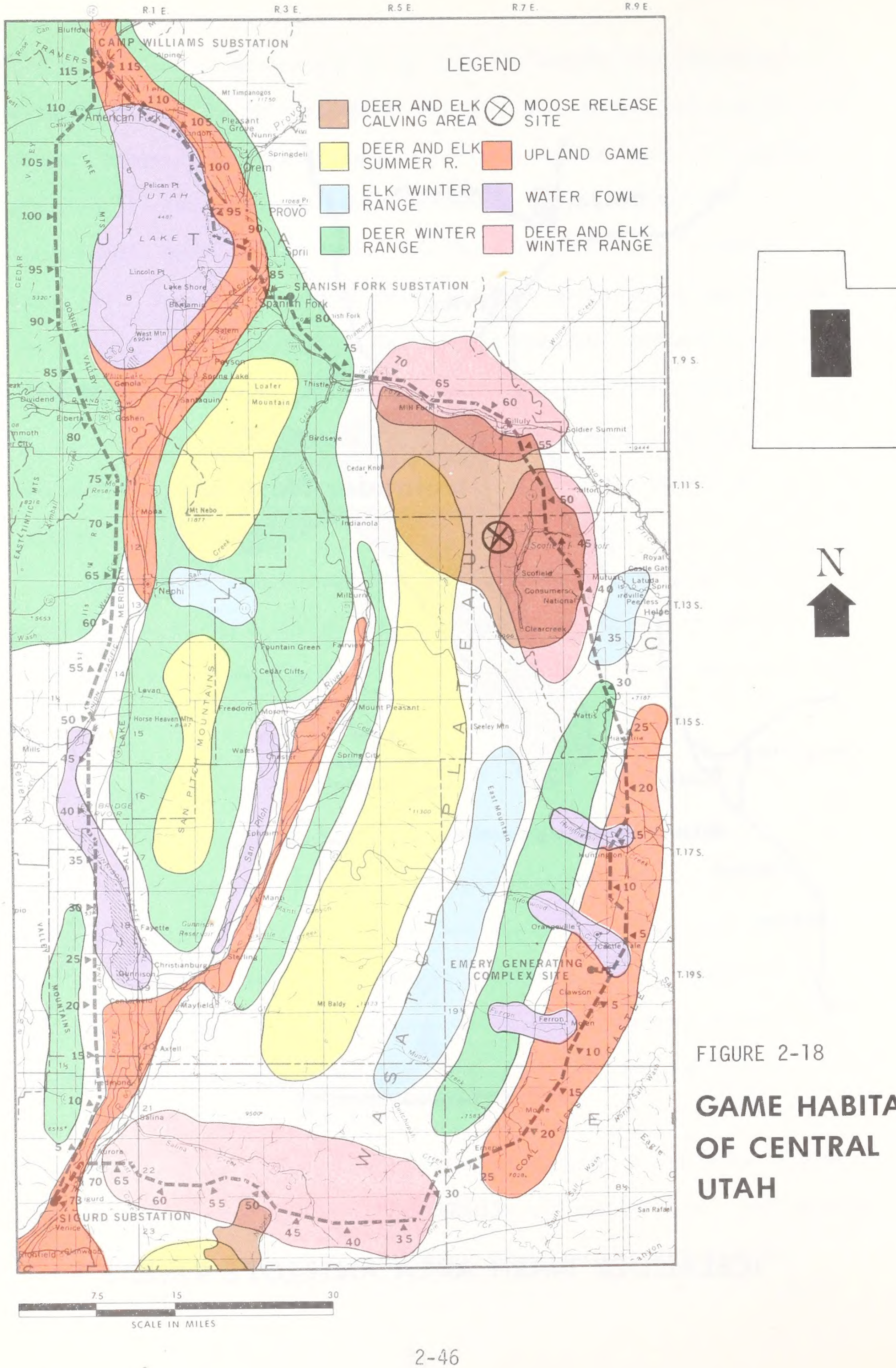


FIGURE 2-18

GAME HABITAT OF CENTRAL UTAH

area) from Huntington to the Book Cliffs throughout the year.

Upland game birds include pheasant; chukar; mourning dove; ruffed, blue, sage grouse and quail. Agricultural and river bottom areas provide habitat for both pheasant, quail, and mourning dove. Chuckars are found in the desert and rockland areas. The three grouse species inhabit the intermediate to high elevations on the Wastatch Plateau. Waterfowl, including ducks, geese, shorebirds, gulls, and terns use the limited water bodies of Carbon and Emery counties and extensive marshes of Utah Lake (Figure 2-12) as partial or year-round habitat type. In addition, waterfowl utilize the Desert Lake Waterfowl Management Area located approximately 10 miles east of Huntington. This 2,621 acre marshland area is unique in that it is the only extensively managed marshland in Southeastern Utah.

Nongame wildlife include song birds, raptors, coyotes, foxes, bobcats, reptiles, amphibians, and a number of smaller mammals. Approximately 50 mammal species, 245 bird species, 20 species of fish, and 33 species of reptiles and amphibians are found in the area (VTN, 1975).

(3) Uncommon and Unique Species

During the winters of 1973 and 1974 a small herd of moose (39 head) was released where upper Fish Creek enters Scofield Reservoir (Figure 2-18). Expansion of this herd is limited due to illegal killing. Present losses due to illegal kills average four head per year (UDWR, 1976).

Other uncommon species believed to be present in the Carbon-Emery county area are the Canada lynx, river otter, and Desert Bighorn sheep (UDWR, 1976b).

(4) Feral Animals

Three herds of wild horses (at least 49 animals), and two herds of wild burros (totaling a minimum of 24 animals) are located on the San Rafael Swell and adjacent areas. This population has increased from 26 wild horses and 17 wild burros in 1971. The 1971 population level represented the number of animals that could be maintained on national resource lands without reduction of livestock numbers or further deterioration of range (Williamson, 1976a).

(5) Threatened and Endangered Species

The American peregrine falcon, which is protected by Federal statute (Endangered Species Act, 1973, 87 Stat. 1064), is the only known endangered species in the Emery and Carbon county area. (a peregrine was sighted in the fall of 1974 within 25 miles of the proposed generating complex site by UDWR personnel.)

There are no species classified as threatened, under the Endangered Species Act, in the project area.

b. Specific

(1) Generating Complex

There are approximately 900 acres of agricultural and riparian vegetation within the generating complex site providing habitat for moderate populations of pheasant. Another 800 acres of agricultural land adjacent to the generating complex site also provides pheasant habitat. The pheasant spring nesting population is estimated to be approximately 200 hens which could produce 920 young. Of the 460 male birds available approximately 240 (based on a 61 percent harvest) would be

bagged on the 1,700 acres (UDWR, 1976c).

(2) Coal Source and Support Facilities

The Wilberg Mine is adjacent to 86,528 acres of classified deer winter range (UDWR, 1963). The area is classified as winter range because snow depths at the higher elevations force the deer herd to concentrate on the lower elevations during the winter months. Presently, the number of deer is relatively low and the current population trend is downward. The exact cause of this trend is not known, but severe winters and poor range conditions are considered to be factors (Cresto, 1975). Location of this range is shown on Figure 2-18. Random reports of elk above the Wilberg Mine have been made. In August, 1973, a herd of 116 elk was observed in Horse Canyon about 6 miles north of the lease area (UDWR, 1976d).

(3) Coal Haul Road

The proposed coal haul road would traverse a variety of wildlife habitats (Appendix VI-1). The pinyon-juniper, riparian, and cultivated vegetation types are the most significant as wildlife habitat. The pinyon-juniper type is important deer winter range.

(4) Transmission Lines

The line through Salina Canyon traverses important wildlife areas (Figure 2-18). Deer and elk summer in the higher elevations of the canyon and winter in the lower elevations. The line would also pass through elk calving grounds. In addition, raptors winter in the canyon, the most notable species being the federally-protected bald and golden eagles.

Spanish Fork Canyon along with the area between the North Fork of Gordon and Soldier creeks are major deer and elk winter ranges. The

latter area is also an elk-calving and deer-fawning area.

The area between Sigurd and Camp Williams contains a number of wildlife habitats. Raptors are present year-round. During the winter months, both golden and bald eagles are present (VTN, 1975).

Site specific profile maps detailing wildlife habitat for all proposed transmission line routes are presented in Appendices VI-3, VI-4, VI-5.

(5) Provo Transmission Line Segment

Historically, the American peregrine falcon inhabited the mountains east of Provo, Springville, and Spanish Fork, and hunted in the Utah Lake marsh areas (Porter, 1975; Porter, et al., 1973). Currently there are no known active peregrine falcon eyries in Utah County; however, migrant peregrine falcon have been sighted in Utah Valley during several recent years (Eyre, 1976).

Utah Lake is the largest natural, fresh water lake in the State. It provides habitat for numerous waterfowl, shorebirds, and small mammals. Several species of fish are present; the major game species are channel catfish, black bullheads, white bass, largemouth bass, and walleye.

8. Cultural and Paleontological Resources

a. General

(1) Cultural (Prehistoric and Historic)

A review of existing data and intensive field surveys have identified a varied cultural resource base for those areas that would be affected

by the proposed action. Only recently have government and university teams begun to adequately inventory and evaluate cultural resources in the region. The region under consideration is the area (primary influence zone) which can be reached within a 2-hour driving time from Price, Utah (Figure 2-19). Intensive field surveys have been made at the generating complex site and along all transmission line routes. All surface manifested cultural sites discovered along all routes have been collected for diagnostic purposes, mapped and evaluated. The entire water pipe line and areas that would be disturbed along the coal haul road are on private land and have not been surveyed. No surface indications of cultural resources occur in areas of the coal mine.

The existence of man in the region could date back 14,000 years or longer. The potential exists for finding this temporal distribution in those areas directly affected by the proposed action. Diverse cultural resources in the area include prehistoric and historic Indian and Euro-American activity with variations in site type, distribution, and cultural affiliation. A chronological transition for the region includes large game hunting (Early Man, circa 12,000 B.C. to 7,000 B.C.); small game hunting, plant gathering and processing (Archaic, 7,000 B.C. to A.D. 500); and marginal (a limited dependence) agricultural (Fremont, A.D. 500 to A.D. 1,250). Recent evidence supports possible earlier Fremont beginnings of circa A.D. 150. A return to a hunting and gathering tradition is apparent with the transitional prehistoric/historic numic-speaking people (i.e., Ute, Piute).

Cultural remnants found within the region are predominantly late Archaic, Fremont, and Numic. Sites consist of lithic scatters (chipped stone), campsites (chipped and ground stone), permanent habitation (pit houses, surface masonry wickiups and tipi rings), rock-art sites, and storage

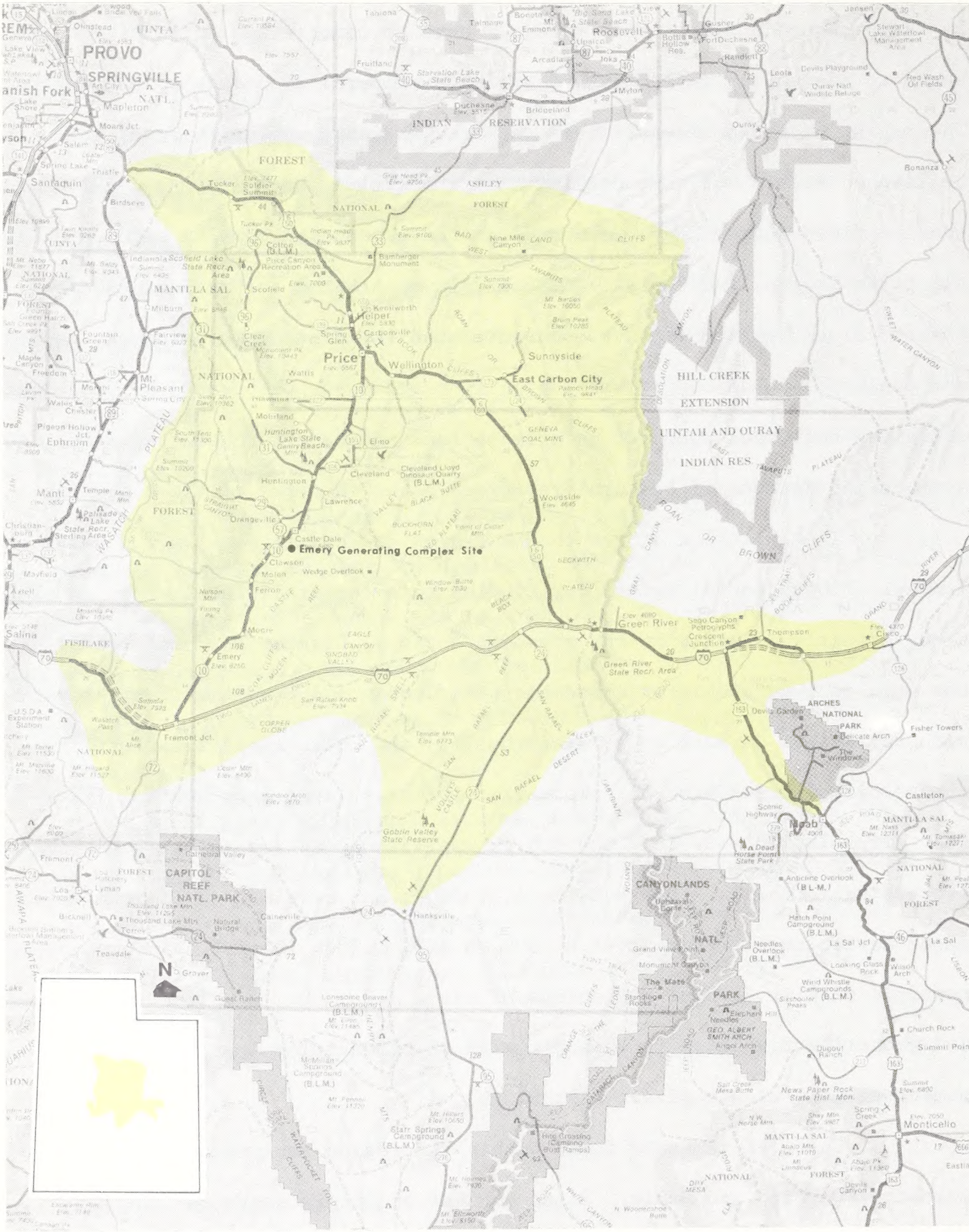


FIGURE 2-19

PRIMARY INFLUENCE ZONE

granaries. Probably 90 percent of the aboriginal cultural resources in the region occur as limited activity, surface scatters. Although unimpressive in appearance, such resources are important to interpretive-educational and aesthetic-recreational values.

Early Euro-American activity included exploration, trapping, mining, colonization, and railroad construction.

Consultation with the Utah State Historic Preservation Officer has revealed that no National Historic Register sites are known to be present in areas affected by the proposed action (Appendix I-8). The nearest site nominated for the National Register of Historic Places occurs approximately 2.5 miles east of the town of Emery (Rochester - Muddy Creek Petroglyphs). Requirements of the Historic Preservation Act of 1966 and Executive Order 11593 of 1971 have been met.

(2) Paleontological

Paleontological resources known to occur in the region include prehistoric floral, faunal, and trace fossils (e.g., tracks). The basic components are: paleobotanical (plants), invertebrate (animals without backbones, e.g., worms, insects, shells), and vertebrate (animals with backbones, e.g., reptiles and mammals, etc.) (Madsen, 1974).

Important paleontological resources, although rather diverse in the region, have not been found in the area directly affected by the proposed action (Miller, 1975).

b. Specific

(1) Cultural (Prehistoric and Historic)

The frequency of cultural resources in areas of the proposed action vary (Table 2-11). All areas, with the exception of the transmission corridors, are either void, or contain only a low potential for such resources (i.e, water pipe line and areas along the coal haul road). Seven sites have been determined as potentially eligible for nomination to the National Register of Historic Places. Appendices VI-3, VI-4, VI-5 show distribution of known cultural resource sites along the proposed transmission line corridors.

(2) Paleontological

The potential for finding significant paleontological values at specific project component sites is remote.

9. Scenic Resources

a. General

Landscape characteristics of the area are common to the semiarid Colorado Plateau country of central and south-central Utah. The general area, ranging from 5,000 to 12,000 feet in elevation, is characterized by broad elevated plateaus, desert valleys, and canyonlands. Erosion of the low-lying desert terrain has produced a rolling panorama with some deeply incised gullies and low escarpments (Figure 2-20). The overall impression conveyed by the area is one of a dramatically sculptured canyon and panoramic desert landscape. The air quality for viewing scenery is considered very good. Visibility measured from the town of Huntington averaged 67 miles. Major scenic attractions include the San

TABLE 2-11

Known Cultural Resources

Project Component	Prehistoric and Historic Indian				Euro-American		
	Lithic Scatters or Open Campsites	Semi-Perm. Habitation	Rock Art	Other	Homesteads or Ranches	Ghost Towns	Other
Generating Complex[a] (Includes waste disposal area)	0	0	0	0	0	0	0
Coal Source	0	0	0	0	0	0	0
Transmission Line[b] Emery-Spanish Fork -Camp Williams	15 (1)[c]	0	0	0	2 (1)	0	0
Transmission Line[b] Emery-Salina Canyon-Sigurd	48 (1)	7 (2)	0	0	1 (0)	0	0
Transmission Line[b] Sigurd-Camp Williams	114 (2)	0	0	0	1 (0)	0	0

[a]Personal communication, Dale Berge to Richard Fike, December 1975 (Survey complete).

[b]Intensive surveys complete (Berge, 1977).

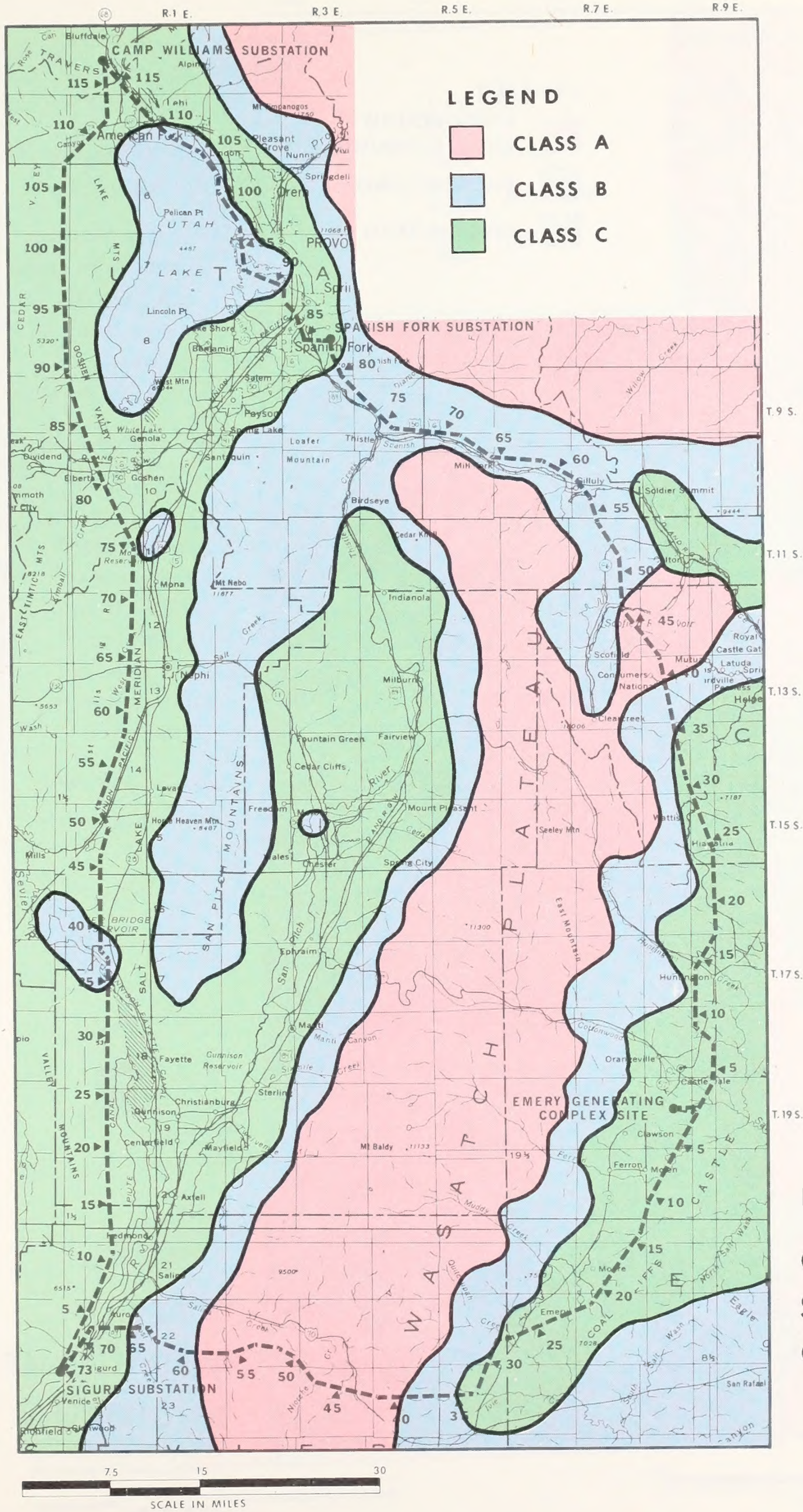
[c]( )Indicates number of sites potentially eligible for nomination to the National Register of Historic Places.

FIGURE 2-20

LANDSCAPE CHARACTERISTICS OF CASTLE VALLEY

Rafael Swell, Manti-La Sal National Forest, and several National Parks.

A Bureau of Land Management (BLM) visual resource inventory and evaluation system was used to identify and assess scenic quality, sensitivity level, and distance zones. Figures 2-21, 2-22, and 2-23 show the relationships of the scenic quality, types of visual zones by distance, and sensitivity levels to the proposed project components.



LEGEND:

CLASS A
Those areas where features of land-form, waterform and vegetative patterns are of unusual or outstanding visual quality.

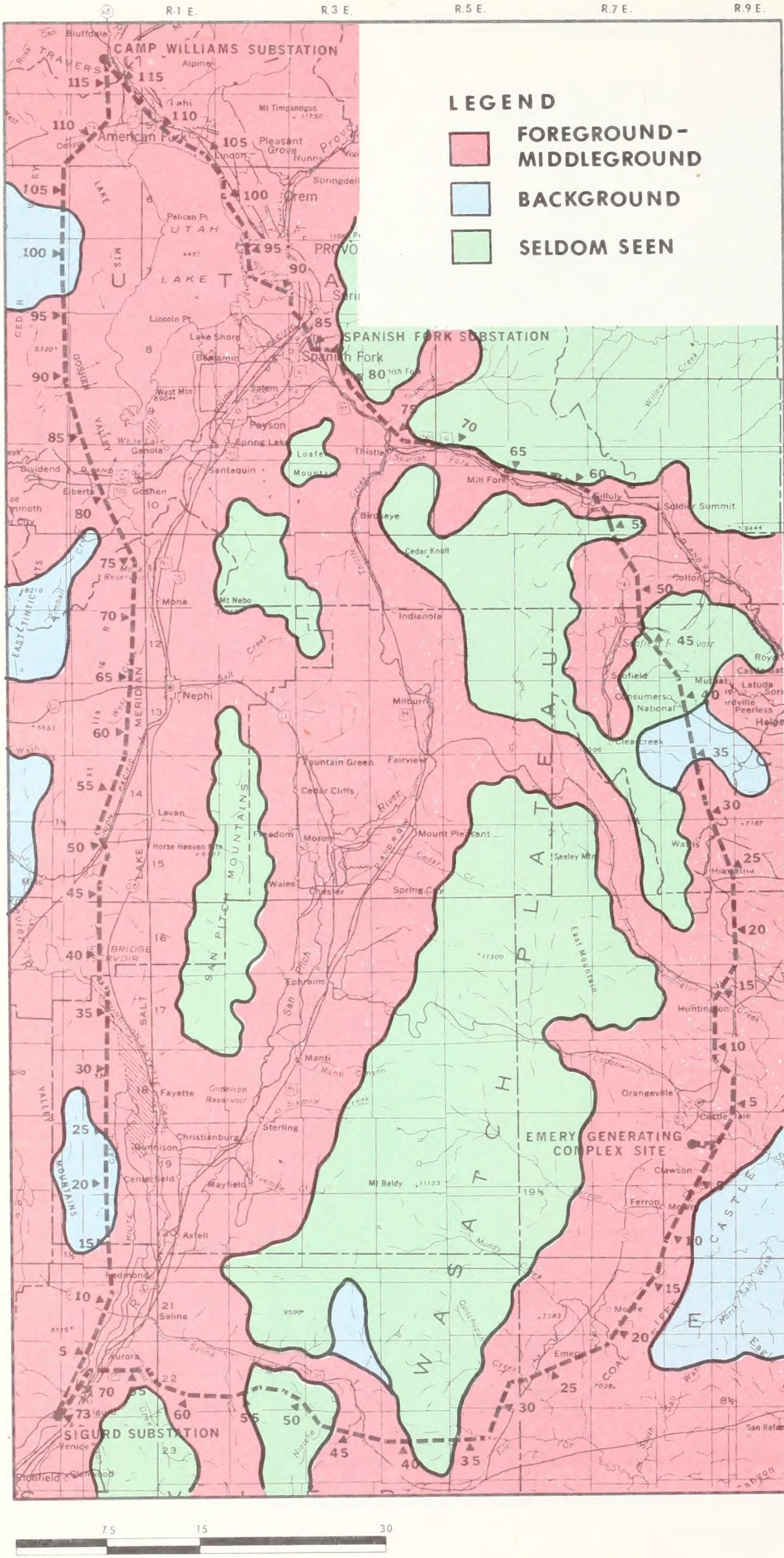
CLASS B
Those areas where features contain variety but not outstanding and lacking dominating features.

CLASS C
Those areas where features have little variety and become monotonous.

N

FIGURE 2-21

CLASSIFIED SCENIC QUALITY



LEGEND

FMg - Foreground-Middleground

The area that can be seen from each travel route or use area from the distance of 0 to 3 1/2 miles.

Bg - Background

The remaining area that can be seen from each travel route or use area from the distance of 3 1/2 miles to approximately 15 miles.

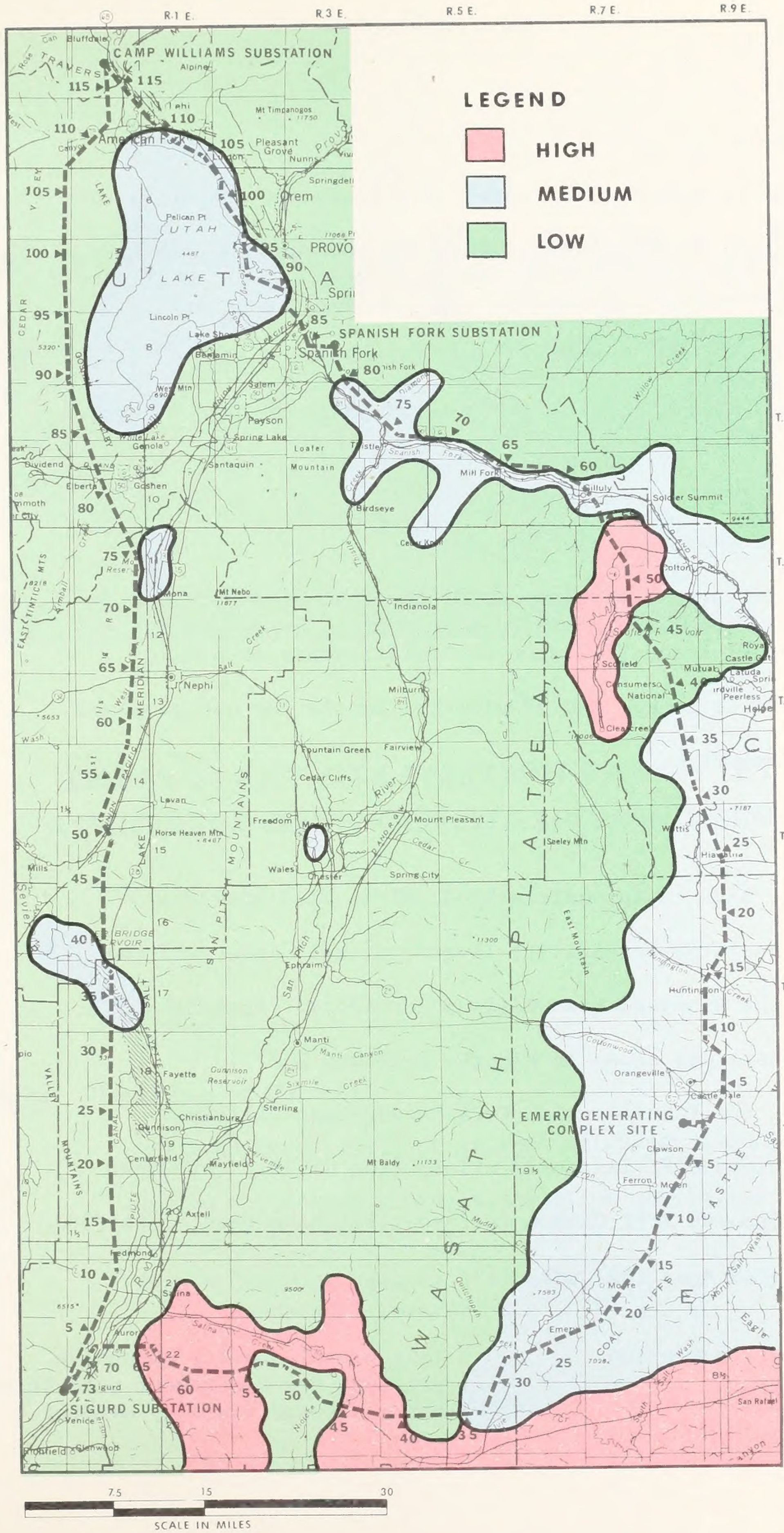
Ss - Seldom seen

Untraveled areas.

N

FIGURE 2-22

TYPES OF VISUAL ZONES BY DISTANCE



LEGEND:

HIGH SENSITIVITY

Public values of the visual resource are important; concern for the quality is major.

MEDIUM SENSITIVITY

Public values are significant; concern is secondary.

LOW

Public values are secondary; concern is minor, the number of people viewing is low.

FIGURE 2-23

VISUAL SENSITIVITY LEVELS

b. Specific

(1) Generating Complex

The generating complex is located in a landscape character of developed grasslands and sagebrush. The man-made contrast is presently low (Figure 2-20). Existing construction has caused the contrast to become stronger. Figure 2-24 shows the generating complex site as it appeared before construction began. Figure 2-25 was taken at the complex site June 14, 1976.

(2) Coal Source, Haul Road and Water Systems

The coal and water components are located in areas of low contrast. Appendices VI-1 and VI-2 show the relationship of scenic quality classes, distance zones, and sensitivity levels for the proposed corridors of these components.

(3) Transmission Lines

The profile maps in Appendices VI-3, VI-4, VI-5 show the locations of scenic quality, sensitivity levels, visual zones, and the contrast levels for the proposed transmission corridors. Examples of low and medium contrasts are shown in Figures 2-26 and 2-27.

Portions of the Emery-Spanish Fork Canyon-Camp Williams transmission line, across USFS lands (23 miles) from Gilluly (milepost 57) to the north of Spanish Fork Canyon (milepost 82) have been classified by the U.S. Forest Service as follows:

10 miles (43.5 percent) retention	-	This visual quality objective provides for management activities which are not visually evident.

FIGURE 2-24

EMERY PLANT SITE WESTERN RANCH SETTING WITH ASSOCIATED DEVELOPMENT SHOWING LOW CONTRAST

Note: Magnitude of Contrast -

Low = Contrast will not attract attention from landscape character.

Medium = Contrast attracts attention and begins to dominate landscape character.

High = Contrast demands attention, will not be overlooked, dominates landscape character.

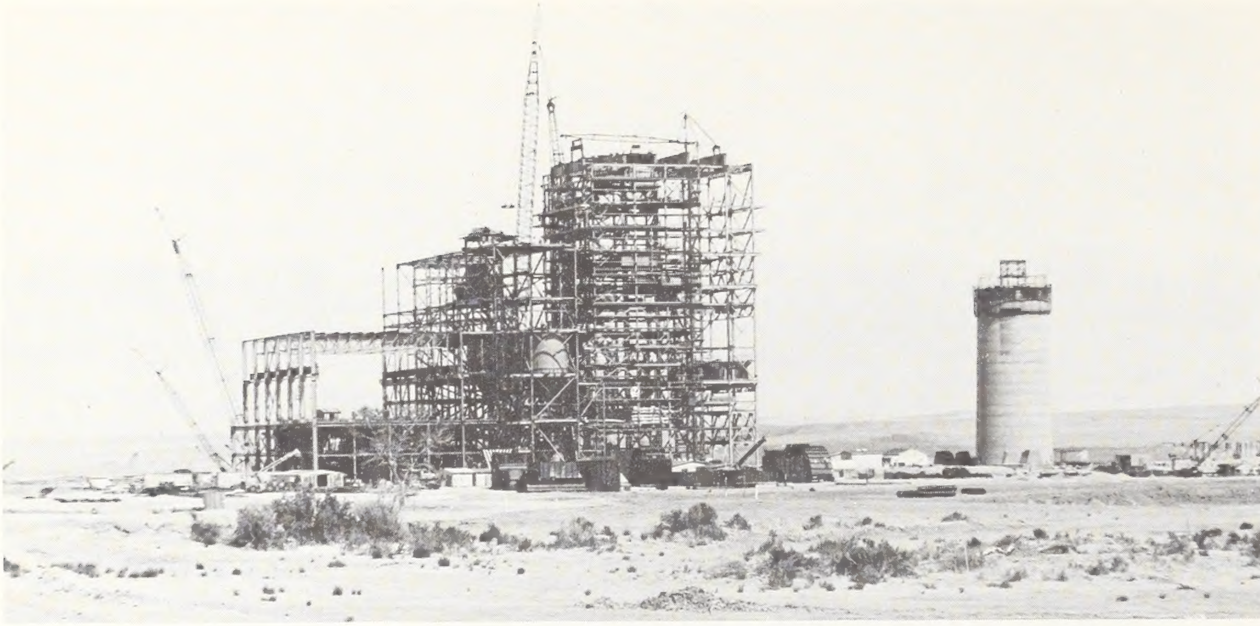


FIGURE 2-25

GENERATING COMPLEX UNDER CONSTRUCTION

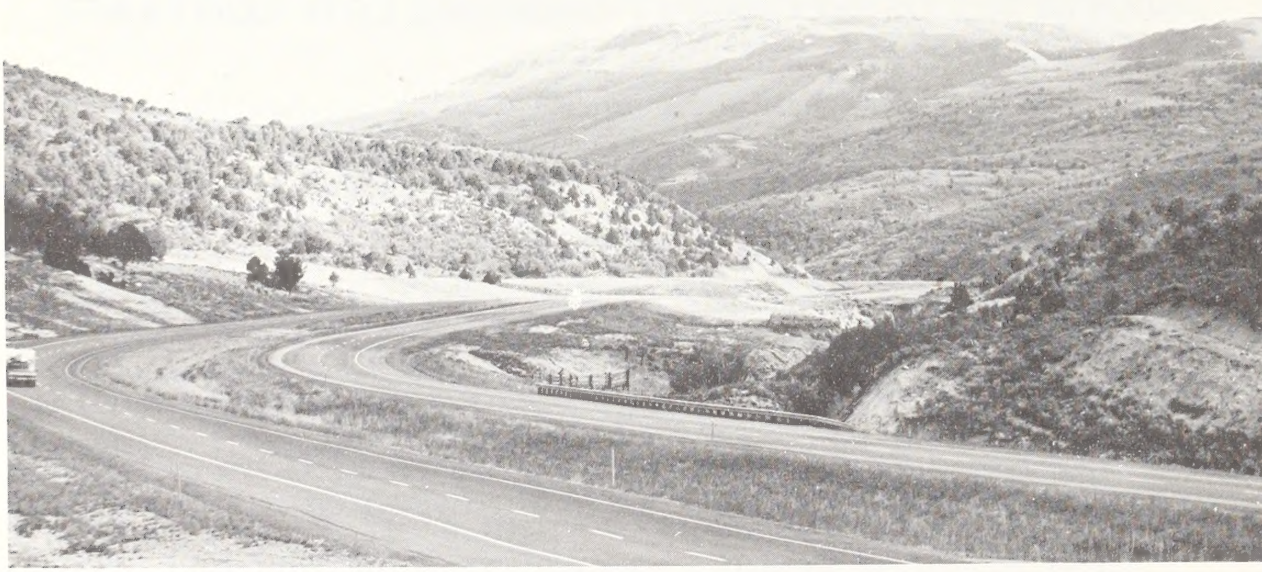


FIGURE 2-26

AREA WITH MEDIUM MAN-MADE CONTRAST
IN EMERY-SALINA CANYON CORRIDOR

FIGURE 2-27

AREA WITH LOW MAN-MADE CONTRAST IN SALINA CANYON-SIGURD CORRIDOR

3 miles (13 percent) partial retention	-	Management activities remain visually subordinate to the landscape characteristic.
10 miles (43.5 percent) modification	-	Under the modification visual quality objective, management activities may visually dominate the original characteristic landscape.

The majority of the line (56 percent) from Diamond Fork to the mouth of Spanish Fork Canyon (mileposts 76 to 84) is classified as retention.

10. Minerals

a. General

Mineral deposits are extensive and somewhat varied in the area of the proposed project. Sand and gravel are abundant. There are also mineable deposits of gypsum, limestone, and uranium (UGMS, 1970). The slopes of the Wasatch Plateau, except for the western slope, are presently active coal mining areas. Both the Wasatch Plateau and the area east are potentially valuable for oil and gas production (UGMS, 1967). With the recent emphasis placed on coal and uranium as sources of energy, exploration activity and mining of these fuels, especially coal, have increased considerably.

b. Specific

The generating complex would be located in the Ferron oil and gas field which currently has one producing well. Oil production from this well is insignificant, but the well does produce enough natural gas to provide for the needs of the town of Ferron. The well is located 12 miles from the proposed generating complex.

Estimated coal reserves in the Wilberg Mine area are in excess of 168,000,000 tons.

11. Land Use

a. General

(1) Agriculture and Livestock Grazing

There are 46,295 acres of irrigated land in Emery County (Millar, 1975). The principal crops are alfalfa and small grains. The

average annual yield is approximately 3 tons of alfalfa and 54 bushels of barley or oats per acre (Utah Agricultural Statistics, 1973). Future increase of irrigated lands is limited due to lack of irrigation water. Water requirements for operation of the generating complex have been purchased by UP&L from irrigation companies and farmers in the area. Irrigation water is supplied from Huntington, Cottonwood, and Ferron creeks.

Livestock production is an important enterprise in Emery County. Cattle and calves on farms number approximately 22,960 head, and sheep and lambs number approximately 18,851 (Millar, 1975). Most grazing lands in Emery County are of the winter type, located in the central and eastern areas. Summer ranges are in the mountains in the western portions of the county. The locations of the irrigated, grazing, and forest lands in Emery County are shown in Figure 2-28. Appendices VI-1, VI-2, VI-3, VI-4, and VI-5 (under vegetative types) show the location of agricultural land along the various corridors.

(2) Recreation

The primary influence zone for outdoor recreation was based upon a 2-hour driving time from Price, Utah (Figure 2-19).

Nearly all land in the primary influence zone is used for extensive outdoor recreation, such as hunting, sightseeing, and off-road vehicle use. Eighteen recreation sites have been developed within this zone. None of these sites were developed using Water and Land Conservation Fund Act monies. Table 2-12 lists the 14 federally-managed and the four state sites and the amount of recreation use the sites received in 1974. Locations of the sites are shown on Figure 2-29. Eight of the sites are

TABLE 2-12

Recreation Use on Selected Sites

Map No.[a]	Site	Number Persons at One Time[b]	Visitor Days[c]	Percent of Capacity[c]
FEDERAL				
1.	Ferron Canyon	125	1,000	3
2.	Ferron Reservoir	172	8,700	27
3.	Joes Valley	240	37,100	66
4.	Indian Creek	450	8,700	11
5.	Forks of Huntington	65	7,500	54
6.	Old Folk Flat	150	8,000	25
7.	Flat Canyon	130	13,000	54
8.	Gooseberry	100	5,500	30
9.	Fish Creek	25	2,200	50
10.	Price Recreation Area	125	7,500	28
11.	Dinosaur Quarry	50	5,400	80
12.	Cedar Mountain Recreation Area	60	5,000	54
13.	San Rafael	20	2,500	60
14.	Avintaquin	135	12,700	46
STATE				
1.	Scofield Reservoir Park	Information not available.		
2.	Huntington State Park	Information not available.		
3.	Millsite Reservoir State Park	Information not available.		
4.	Green River State Park	Information not available.		

Source: U.S. Forest Service and Bureau of Land Management Recreation Use Reports, 1974.

[a]Numbers refer to sites in Figure 2-29.

[b]Indicates the number of persons who can use the site at one time.

[c]Recreation use reported in visitor days for 1974. (A visitor day consists of 12 visitor hours which may be aggregated by one or more persons).

[d]Statistical sampling indicates that the use of well-managed sites falls between 20 and 40 percent of capacity. Well-managed sites are sites not showing signs of deterioration from overuse.

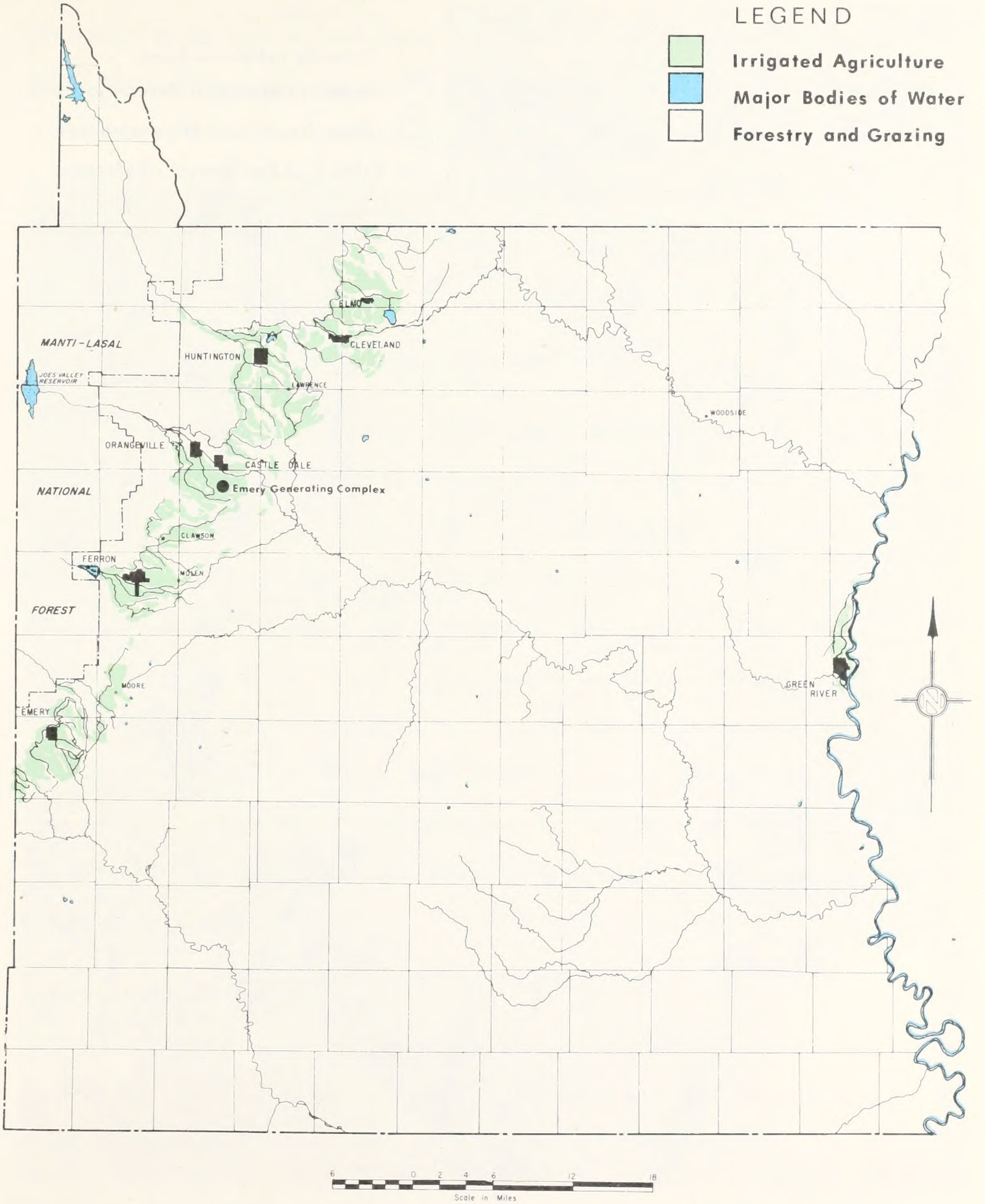


FIGURE 2-28

EMERY COUNTY EXISTING LAND USE

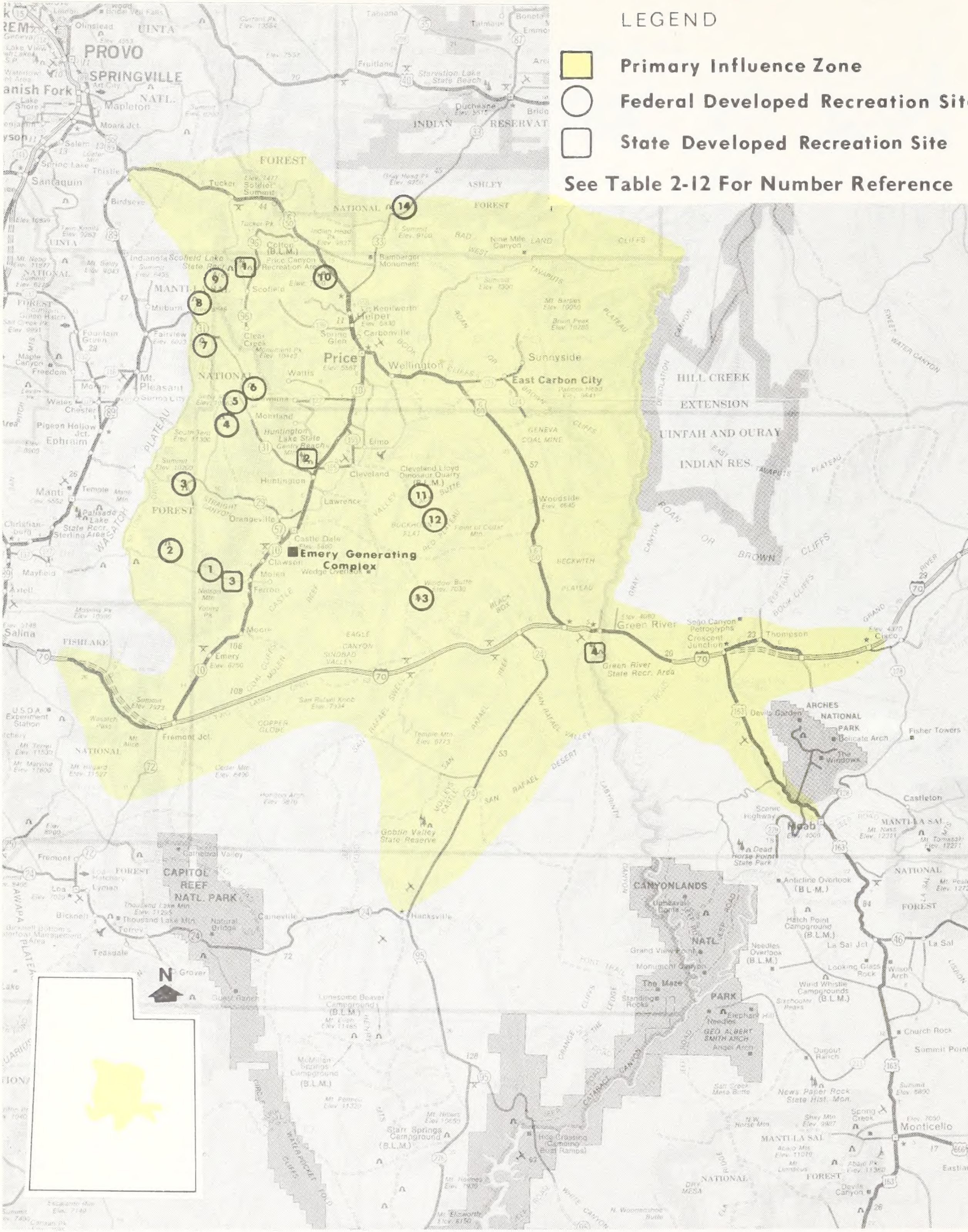


FIGURE 2-29

PRIMARY INFLUENCE ZONE SHOWING DEVELOPED RECREATION SITES

presently being used beyond their capacities (over 40 percent capacity). Price City manages six city parks containing 30 acres; 7.5 additional acres are proposed for development. Recreation standards recommend 2 to 4 acres of city park land per 1,000 population (USDI, BOR, 1967). These standards are currently being met.

b. Specific

(1) Generating Complex

Prior to construction approximately 800 acres of the 2,000-acre complex area was irrigated crop land. The balance (approximately 1,200 acres) was native grazing land. An additional 1,430 acres of private land has been purchased by UP&L. This 1,430 acre tract is located immediately west of the generating complex site. About 800 acres are irrigated crop lands and 630 acres undeveloped grazing lands. Utah Power and Light is retiring the crop acreage by withholding irrigation water in hope that this action would lower the water table at the generating complex. Table 2-13 shows land ownership and acreages of agricultural and livestock grazing lands that would be occupied by the various project components.

(2) Coal Haul Road

The coal haul road would traverse native range and irrigated farm lands. Nine acres of native range and 30 acres of irrigated land would be involved.

(3) Provo Transmission Line Segment

The Provo City segment of the proposed Emery-Spanish Fork Canyon-Camp Williams transmission line would pass near Provo Bay, a

TABLE 2-13

Land Use and Ownership

	Project Components (acre)							
	Generating Complex		Coal	Coal	Water	Transmission Lines[b]		
	Inside	Outside	Source[a]	Haul Road	Pipe Line	#1	#2	#3
Land Use								
Livestock Grazing	1,200	630	100	9	21	1,371	877	1,576
Agriculture	800	800	0	30	12	430	116	284
Reservoir Withdrawal	0	0	0	0	0	15	0	0
Land Ownership								
Private	2,000	1,430	0	39	33	1,241	379	1,119
State	0	0	0	0	0	95	63	205
US Forest Service	0	0	34	0	0	268	315	0
BLM	0	0	66	0	0	237	236	536
Bureau of Reclamation	0	0	0	0	0	15	0	0
TOTAL	2,000	1,430	100	[c]39	33	1,816	993	1,860

[a]Includes acreage of coal conveyor and road to the storage area from mine portal. The surface area above the mine is 2,578 acres of Forest Service land, and 2,080 acres owned by private individuals.

[b]Transmission Line #1 Emery-Spanish Fork-Camp Williams.
Transmission Line #2 Emery-Salina Canyon-Sigurd.
Transmission Line #3 Sigurd-Camp Williams.

[c]Figure represents only the acreage involved in new road construction.

5,200 acre wetland area that is extensively used by hunters, fishermen, and nature study groups. In 1968, UDWR built an access road into the area. This road is the only means of access on the east side of Provo Bay. The road is in the proposed transmission line corridor along the east side of Interstate 15 (I-15).

The Provo segment of the line also passes adjacent to the Powell Slough Waterfowl Management Area located on 631 acres of national resource lands leased by UDWR. Average hunter use on this area for the period 1962-1971 was 1,439 hunter trips per year (Jensen, 1974).

In the Provo area the proposed transmission line would cross lands classed as agricultural, low density residential, and light industrial. Most of the lands that would be affected are within the city limits of Provo. There are 20 single family homes and six miscellaneous structures within the proposed right-of-way.

This segment would cross about 1 mile of Federal reservoir site withdrawal for the Central Utah Project.

(4) Land Use Plans, Policies, and Controls

(a) General Discussion

When construction of the generating complex was initiated in March, 1975, the surrounding lands were zoned for agriculture and grazing. Later, in 1975, Emery County rezoned the lands in the complex area to include industrial development.

Resources associated with federal lands in central Utah (including the counties of Emery, Carbon, Sevier, Sanpete, Juab and Utah) are managed under policies and guidelines of Management Framework

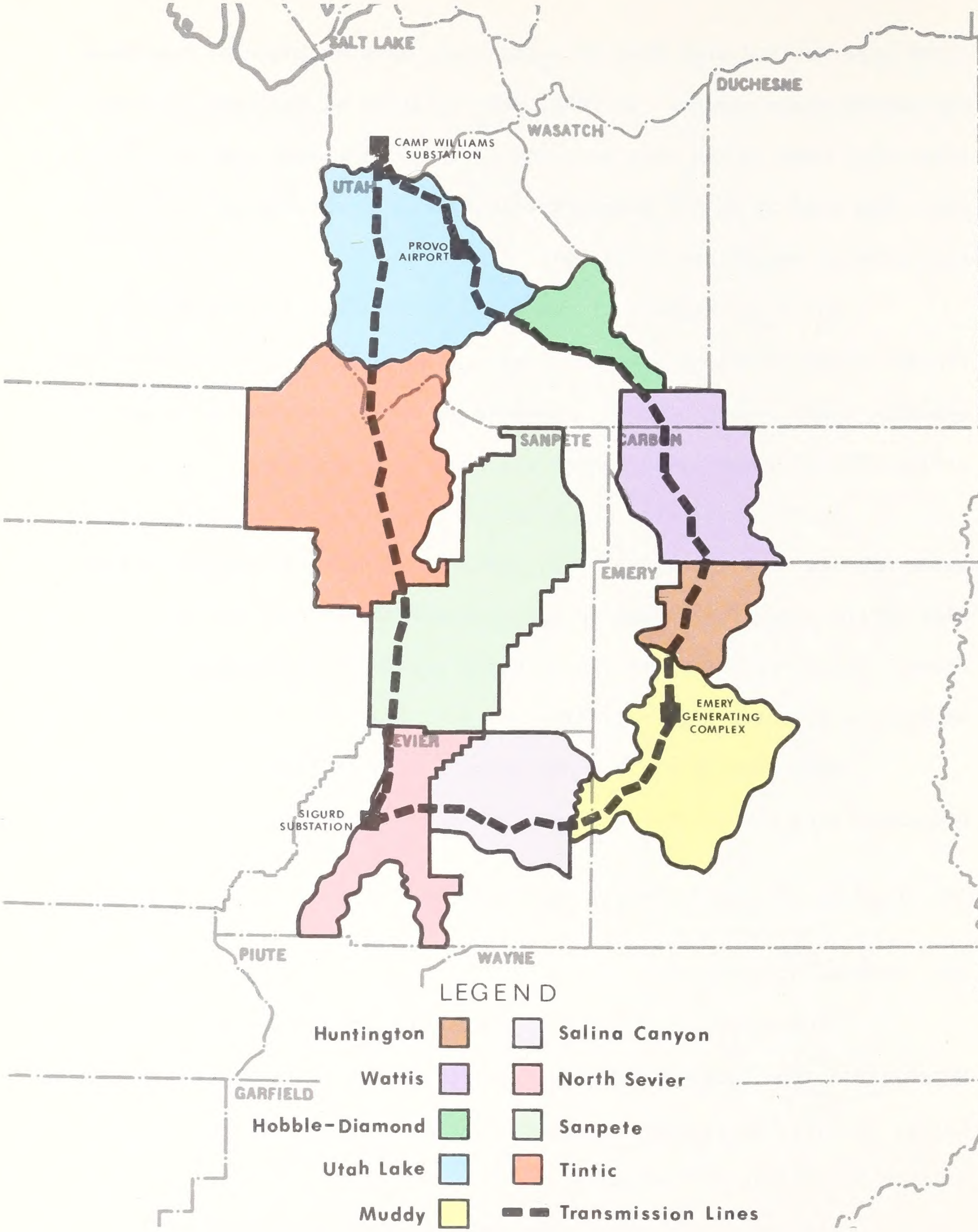


FIGURE 2-30

CENTRAL UTAH PLANNING UNITS

Plans developed by the BLM, and Land Use Plans developed by the U.S. Forest Service (Figure 2-30). Land use policies, controls, and decisions are based on these planning documents.

Most of the unimproved state lands in the area are managed by the State Division of Lands without detailed land use management plans or programs. However, state land actions generally conform with other state and local codes and regulations.

County lands are regulated by zoning programs. Each of the aforementioned counties have adopted local zoning ordinances which basically include general areas for industrial-commercial, agricultural, agricultural-residential, and forestry-recreational-range development. In some instances, residential areas have been zoned immediately adjacent to unincorporated towns and in areas of summer home development.

Essentially all major cities and towns located in the six counties have adopted effective zoning ordinances to regulate city development (including residential, commercial, and industrial areas; subdivisions; mobile home areas; water services; public utility services; and streets).

(b) Provo Transmission Line Segment

Current Provo City zoning ordinances allow utility line rights-of-way in all areas crossed by the proposed transmission line route; however, the new Utah County zoning ordinances limit the size (voltage) of transmission lines (Table 2-14). Under the new ordinance a 345 kilovolt (kV) line would be allowed only in areas zoned I-1 industrial. Figure 2-31 shows the current zoning of Utah County and Provo City which would be affected by the Provo segment of the Emery-Spanish Fork Canyon-

Camp Williams transmission line.

TABLE 2-14

Utah County Zoning Limitations on Electric Transmission Lines

Zone	Permitted Uses	Conditional Uses
A-1 (Agricultural)	69 kV	Less than 345 kV
TR-10 (Transitional Residential)	69 kV	None
I-1 (Industrial)	69 kV	Over 69 kV
FPO (Flood Plain Overlay)	None	None

Table 2-15 shows federal, state, and local land use plans presently developed and in use.

12. Human Resources (Carbon and Emery Counties)

a. Demographic Trends

At the present time, Carbon and Emery counties are experiencing an economic boom related to coal development. It is anticipated that within 5 years, Carbon and Emery counties will produce at least 10,000,000 tons of coal (College of Eastern Utah, 1974). Several companies, including Braztah, Valley Camp, and Plateau, are now constructing larger surface facilities to accommodate increased mining. Carbon and Emery counties are somewhat removed from other population centers in the State and, consequently, most socioeconomic activity should occur locally.

The population of Carbon and Emery counties declined between 1960 and 1970, and unlike other counties in the state the population shifted from urban to rural areas.

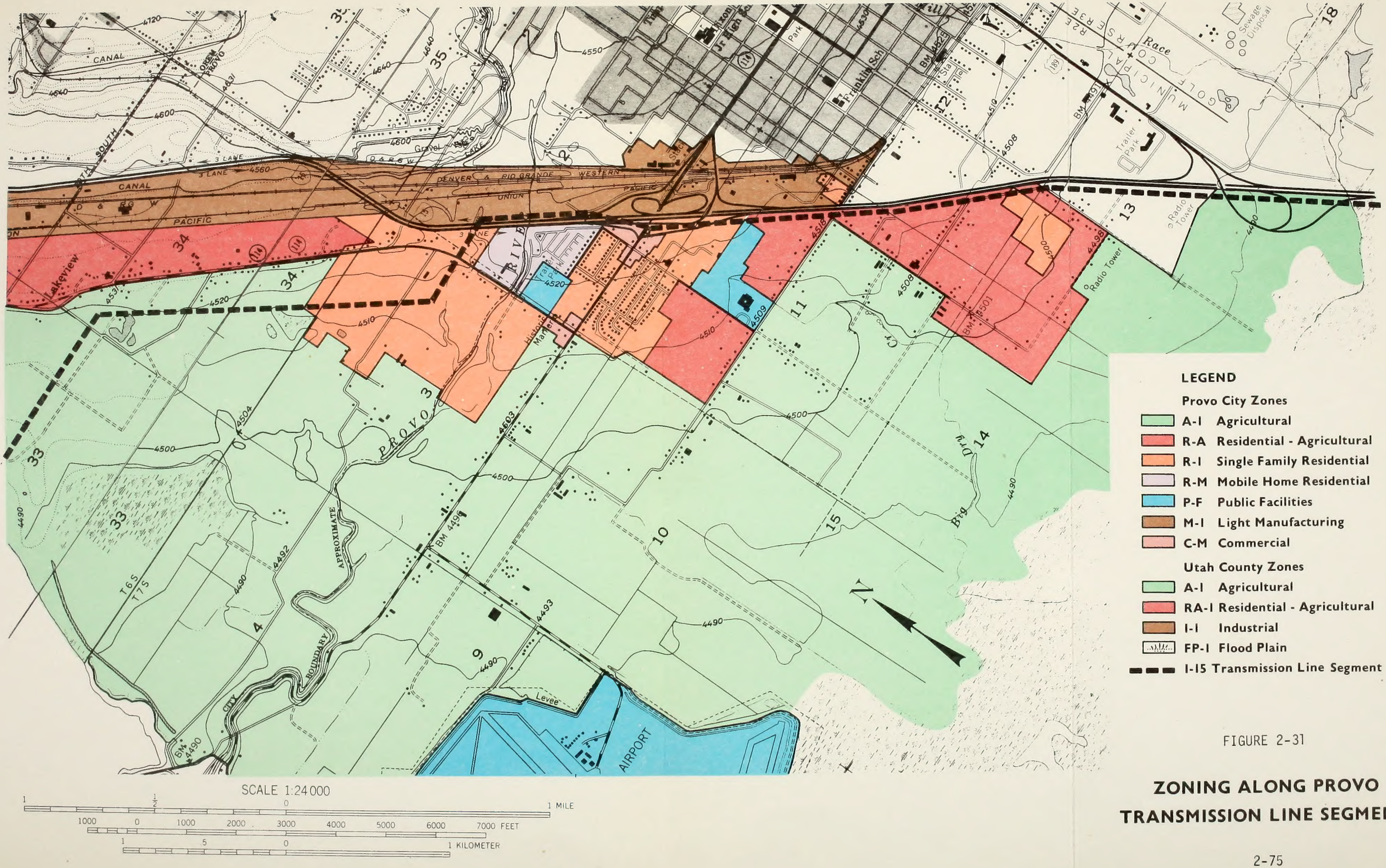


FIGURE 2-31

ZONING ALONG PROVO TRANSMISSION LINE SEGMENT

TABLE 2-15

Federal, State and Local Land Use Plans

Plan	Government or Local Entity	Status
Management Framework Plans	BLM	Prepared 1968-1975
Land Use Plans	U.S. Forest Service	
	Uinta National Forest	
	Hobble-Diamond (Spanish Fork Canyon)	Preliminary status only
	Fishlake National Forest	
	Salina Canyon	Prepared 1975
Comprehensive Plan[a]	Carbon County	Adopted 1971
Zoning Ordinance	Sevier County[b]	Adopted 1965
Zoning Ordinance	Juab County[b]	Adopted 1966
Zoning Ordinance	Utah County[b]	Adopted 1968
	(Sewer and added housing)	" 1973
Mountain Home Subdivision Plan Only	Sanpete County	Adopted 1974

Note: Local use plans are for Emery, Carbon, Sevier, Sanpete, Juab, and Utah counties.

[a]See Appendix II for a more complete description of these terms.

[b]Presently working on current master plans.

The population decline has since reversed, and both counties are now increasing in population. From 1970 to 1973, before the Emery project began, the population of Carbon County increased 20.8 percent, to about 18,900 persons. During the same period, Emery County increased 30.4 percent, to about 6,700 persons (U. of U., 1975). In 1975, the total population of both counties was estimated to be 25,600. This growth can be attributed to renewed mining activity and power plant construction. The estimated population of major communities in Carbon and Emery counties is shown in Table 2-16.

TABLE 2-16

Population of Counties and Representative Communities

Town	Population (1970 Census)	Population (1975 Estimated)
Carbon County (Total)	15,647	18,900
Helper	1,964	2,400
Price	6,218	7,500
Wellington	922	Not Available
Emery County (Total)	5,137	6,700
Castle Dale	541	1,200
Huntington	857	2,800
Orangeville	511	800
Ferron	663	2,000

Source: Bureau of Economic and Business Research, 1976

Presently, 534 personnel are employed in construction at the Huntington site, and an additional 360 men are constructing the Emery

TABLE 2-17

Labor Force Characteristics for Carbon and Emery Counties and the State of Utah 1974

Characteristics	Labor Force		
	Carbon	Emery	State
Farm Proprietor	145	349	13,247
Nonfarm Proprietor	607	293	33,421
Farm Salary-Wage	67	43	4,957
Government			
Federal Civilian	147	41	37,852
Military	-----	---	4,173
State and Local	1,246	456	70,505
Private Nonfarm[a]			
Manufacturing	286	35	69,141
Mining	1,095	842	13,368
Construction	200	460	24,126
Transportation, Communication, and Public Utilities[a]	503	---	26,721
Trade	1,177	299	102,012
Finance, Insurance, and Real Estate	[b]-----	[b]---	20,903
Services	542	[b]---	71,040
Other	[b]-----	[b]---	962
TOTAL	6,199	3,017	492,428

Source: (USDC, 1975).

[a]Primary source for private nonfarm employment: ES-202 Covered Employment - Utah Department of Employment Security.

[b]Not shown to avoid disclosure of confidential information. Data are included in totals.

site. At least 50 percent of the construction workers live in the Price-Helper area. The remainder live in other areas of Castle Valley. These power plant construction workers and their families represent a population increase of 925 new residents. An estimated 240 new residents are in Castle Valley due to the service jobs related to the Emery generating complex construction. The total population added as a result of the Emery project is estimated to be 1,165.

b. Activities

(1) Income and Employment

The basic employment sectors in both Carbon and Emery counties traditionally have been agriculture and mining. Mining accounts for 18 percent of all working population in Carbon County and 28 percent of the Emery County working population compared to a state average of 3 percent (Table 2-17).

The average per capita income in both counties was below the state average through 1974. In 1974, per capita income in Emery County was below the state average by $332 (Table 2-18). The rate of growth in income was greater in Emery County than in the rest of the state. Emery County's personal income grew by 18 percent annually, whereas the state's grew by 8.5 percent annually. This rapid increase in income was caused principally by construction of the Huntington generating complex. The recent construction at the Emery site has, to a lesser extent, contributed to the per capita income increase.

Construction employment associated with the Huntington complex peaked near 850 employees. As the first unit neared completion, the construction workers were phased into construction of the second unit.

This phasing of the employees has created a fairly constant construction population over the past 3 years.

The first unit at Huntington employs 100 operators and 350 miners in the Deer Creek Mine. The second unit is expected to go on line in 1977. This unit will employ an additional 70 plant operators and an estimated 250 additional miners.

TABLE 2-18

Per Capita Personal Income

Unit	Per Capita Income		
	1965	1970	1974
Carbon	$2,046	$3,030	$4,412
Emery	1,541	2,135	4,136
Southeastern MCD[a]	1,965	2,590	3,845
State	2,390	3,227	4,468

Source: USDC, 1975

[a]Southeastern Utah Economic Development District (Carbon, Emery, Grand Counties)

(2) Economic Base

Mining and agriculture contribute significantly to personal income in Castle Valley, providing the basis for much of the economic activity in the area. In 1974, the contribution of agriculture and mining to total personal income in Emery County was $704,000 and $11,192,000 respectively. These sectors contributed more than 46 percent of all personal income in Emery County. In Carbon County these sectors contributed over 22 percent of total personal income.

The importance of agriculture and mining to Carbon and Emery counties is also shown by the number of persons employed in those sectors. These sectors accounted for over 21 percent of those employed in Carbon County, and over 40 percent of those employed in Emery County (USDC, 1975).

Carbon and Emery counties have a service-based employment ratio lower than national averages due to the nature of the rural economy and the proximity of other population centers. Some goods and services are obtained in the population centers of Provo and Salt Lake City.

(3) Regional Tax Base

The 1975 assesed valuation of all property in Emery County was $49,247,952 and $40,037,695 in Carbon County. Property taxes charged in Emery and Carbon counties for 1975 were $2,763,798 and $3,245,208, respectively. The assessed value of the partially completed Emery plant was $3,006,914 in 1976, which required approximately $160,000 in property taxes.

The Wilberg Mine had an assessed value of $551,510 in 1976, requiring $42,000 in property taxes.

Persuant to Utah Senate Bill No. 231 passed in 1975, a new Special Service District has been organized in the Castle Valley area. This district was created to help finance sewer, water, and drainage improvement projects. The monies collected by the District could be used for the benefit of local communities.

c. Housing and Community Services

(1) Housing Characteristics

(a) Carbon and Emery Counties

Changes in mining and agricultural activities resulted in population decreases between 1950 and 1970. The drop in population adversely affected the housing situation in the Carbon and Emery areas, primarily in terms of the amount of new housing, housing conditions, and the availability of housing. A declining economy caused numerous vacancies and lower rents.

The Southeastern Utah Association of Governments indicated that direct housing changes caused by the Emery project to date are difficult to isolate since housing is fluid and the demand is more acute at certain times and less at others. Presently, there is a total of 2,450 houses in Emery County and 5,440 in Carbon County.

Between 1970 and 1974, Huntington plant construction employees and new coal mining employees quickly filled available housing. In September 1974, permanent housing was extremely difficult to obtain in Price, Huntington, and Castle Dale except at inflated prices. In this vicinity, land prices in October 1974 were at least five times greater than selling prices in 1969 (Price City Recorders Office, 1974).

In 1974, few rental units were available and a one-bedroom unit rented for about $250 a month (Southeastern Utah Economic Development District, 1974). Local hotels and motels now rent rooms by the month to short-term or single employees. Mobile home parks exist but are located in unimproved areas and may not be attractive housing alternatives.

Water hookups for new housing may be purchased in Price and Helper, but such hookups are currently not available in the rest of Carbon County. Water hookups may be purchased in Emery County. The Development District indicates that a $3,000,000 water bond proposal was passed for construction of an 18-inch pipe line and treatment facilities for Carbon County (Southeastern Utah Economic Development District, 1975).

(b) Provo Transmission Line Segment

In the proposed transmission line right-of-way corridor through the Provo City area, there are 20 single family residences. The age and value of these homes is given in Table 2-19. There are 3.5 persons per household in the proposed corridor area. Approximately 65 percent own their own homes, and 50 percent have changed their residences in the 5-year period ending in 1970.

TABLE 2-19

Single Family Homes - Freeway Route Right-of-Way

Number Homes	Age Group	Value of Class
15	1-15 years	$45-60,000
3	1-15 years	30-45,000
1	15-25 years	30-45,000
1	over 25 years	15-30,000

In addition to the single familiy residences, a condominium development is currently being built. The developer's plans include expansion eastward into the area of the proposed transmission line corridor. This project is being developed in three phases. Phase one

is underway and 15 units, of a planned 25 units, have been completed. When completed the development will consist of 110 units and associated amenities.

Residents in this proposed corridor area generally are satisfied with their neighborhood and share a high degree of subcultural homogeniety. They are aware that their area is rapidly changing from an agriculturally-oriented fringe of Provo City to a more urbanized residential area. The construction of the freeway (I-15) and issues centering around its location, have tended to socially and physically separate the residents in this area from those in the greater Provo area. Residents and developers recognize the amenities of an agriculturally-oriented area close to business centers, with panoramic views of the Wasatch Mountains to the east and Utah Lake to the west.

(2) Community Service

(a) Local Governments

Carbon and Emery counties operate under county commissions. Each town in the area has a mayor-council form of government. All mayors, councilmen and commissioners serve on a part-time basis.

(b) County and City Zoning Ordinances in Carbon County

Carbon County is completely zoned.

Price City has recently revised regulations for subdivisions and mobile home parks. For conventional subdivisions, improvements must include streets, travel easements, sewer mains, sewage disposal, water mains, reservoirs, and drainage ways. Consideration must also be given to sites for schools, parks, playgrounds, and other areas for public use

(Ordinance 118, Price, Utah).

Mobile homes must be located in a mobile home court unless the home meets the more stringent requirements for permanent housing. A mobile home court must have all public utilities (Ordinance 112, Price, Utah).

(c) Zoning Ordinances Emery County

Emery County passed a zoning resolution (ordinance) in 1970 providing for six zone classifications and a Board of Adjustment. Administration includes a zoning administrator and building inspector.

Emery County is presently revising its zoning ordinance to include mobile home park regulations (Stanton, 1974).

(d) Water Supply and Sewage Disposal Systems

Water supplies are limited in Carbon and Emery counties (Table 2-20). In Carbon County water taps may be purchased within Price and Helper city limits only.

Some water taps are available in most communities in Emery County. Huntington City, with a $1,740,000 grant and loan of which $870,000 must be paid back, is now rebuilding its water supply system and will have an expanded capacity in about 2 years. The Price River Water Conservancy District is currently making plans for the installation of a new 18-inch water line and associated treatment facilities. The District sold bonds for $3,100,000 for this project. The Carbon County sewage system is operating well below designed capacity. The Emery County sewage systems were near capacity levels when construction of the Huntington units began. However, a new sewer system with a capacity for 1,200 people has been completed for Ferron. Total cost was $228,000

TABLE 2-20

Water System Specifications
1976

City	Sources[a]		Storage[b]		Number of Connections
	Present capacity (gal/d)	State guidelines[b] (gal/d)	Present capacity (gal/d)	State guidelines[b] (gal/d)	
Helper	1,300,000	1,556,800	3,000,000	778,400	973
Price	5,760,000	6,560,000	7,250,000	3,280,000	4,100
Huntington[c]	1,278,000	1,360,000	1,000,000	680,000	850
Orangeville	232,000	376,000	500,000	188,500	235
Castle Dale	430,000	640,000	750,000	320,000	400
Ferron and Clawson[c]	1,293,000	873,600	750,000	436,800	546

[a]Combined flows and storage capacities available to each community were derived from information from Utah State Department of Social Services, Health Division, and from interviews with local government officials.

[b]Guidelines are estimates for efficient system operation from the Utah State Health Division. 1,600 gallons per day, per connection, were used for source guidelines, and 800 gallons per day, per connection, were used for storage guideline.

[c]These data include new water system improvement projects currently underway.

with a bond for $57,000. A new lagoon sewage treatment system, costing $1,260,000 with $250,000 being provided by bonds, with a capacity for 3,000 people is being built for Huntington. Present capacities for communities in Carbon and Emery counties are shown in Table 2-21.

(e) Education

Enrollment, condition of facilities, and building capacities of Carbon and Emery schools are shown in Tables 2-22 and 2-23. With the exception of one elementary school in Price, most Carbon County District schools could accommodate increased enrollments. In a recent election, voters approved a $2,000,000 school bond issue for a larger Price elementary school and other school improvements.

Many Emery County schools are presently being used above capacity.

(f) Public Safety

Police.

The present number of policemen and the number presently needed are presented in Table 2-24. Generally most communities now need additional policemen. Crime rates in the general area have doubled in the last 3 years.

Fire.

Fire protection in each of the five towns is provided by volunteer fire departments. Fire insurance classifications varies among the towns. Within the city limits, Price has a fire rating of 6 (moderate). Outside the city limits the fire rating is 10 (high risk). Huntington, Emery, and Castle Dale are all high risk insurance areas, with a classification of 9 within the city limits and 10 outside. The

TABLE 2-21

Sewage Disposal Systems

Community	Estimated Population	Average Daily Flow (gal/d)	Design Capacity	
			Mean Flow (gal/d)	Population Equivalant
Price[a]	10,413	1,117,000	1,800,000	24,100
Huntington	1,325	130,000	------	[b]3,000
Orangeville	600	60,000	no treatment[c]	-----
Castle Dale	660	70,000	no treatment[c]	-----
Ferron	800	100,000	110,000	960

Source: Billings, 1976

[a]Price River Water Improvement District - includes Helper, Castlegate, Price, Wellington, Spring Glen, and unincorporated areas.

[b]To be built.

[c]Regional Plant (Orangeville-Castle Dale) planned for 1976, capacity 3,000 population.

TABLE 2-22

Profile of Emery County School District
(1975)

School	Existing Conditions				
	Location	Present Enrollment	Capacity	Grades	Condition of Buildings
Emery County High School	Castle Dale	344	330 (390 added with expansion)	10-12	New Addition (finished in spring 1976)
North Emery Junior High School	Huntington	228	207	7-9	Poor
South Emery Junior High School	Ferron	187	207	7-9	Poor
San Rafael Elementary School	Ferron	160	190	K-6	Good
Cottonwood Elementary School	Orangeville	228	176	1-6	Good
Cleveland Elementary School	Cleveland	112	87 (60 added with expansion)	1-6	Good
Green River School	Green River	241	417	K-12	Poor needs repairs
Huntington Elementary School	Huntington	278	190	K-6	Good

Source: VTN, 1975b.

TABLE 2-23

Profile of Carbon County School District
(1975)

School	Existing Conditions				
	Location	Present Enrollment	Capacity	Grades	Condition of Buildings
Carbon County High School	Price	722	1,200	10-12	New, good; new library media center
East Carbon H.S. (Jr-Sr High Combined)	East Carbon City	290	330	7-12	New, good
Helper Junior High	Helper	256	330	7-9	Just remodeled
Mont Harmon Junior High	Price	627	650	7-9	Built 1970, good
Durrant Elementary School	Price	400	400	K-6	Built 1958, new wing 1968; new wing planned
Price Central Elementary School	Price	381		1-6	Emergency building being rebuilt
Reeves Elementary School	Price	249	350	K-6	Built 1920, new wings 1955, 1968
Wellington Elementary School	Wellington	253	350	K-6	New, good
Sally Mauro Elementary School	Helper	391	480	K-6	Good
Peterson Elementary (Training School and Special Education)	Sunnyside	267	300	K-6	
College of Eastern Utah	Price	850	1,050	2 yr	Good

Source: VTN, 1975c.

number of volunteer firemen and vehicles in each town are: 21 volunteer firemen and four vehicles in Price, four volunteer firemen and one fire engine in Huntington, six volunteer firemen and one truck in Castle Dale, and one fireman and one truck in Emery. A fire department should provide full-time protection once a city reaches a population of 5,000 (Code Scott Insurance Agency, 1974).

TABLE 2-24

Law Enforcement Officers in Carbon and Emery Counties

Town	Present Number	State Standard[a]
Carbon County		
Helper	5	5
Price	10	15
Wellington	--	--
Emery County		
Castle Dale	1 (part time)	2
Huntington	1	6
Orangeville	1	2
Ferron	0	4

Source: U. of U., 1976

[a]State Standard is computed as 2 police officers per 1,000 of population.

(g) Public Health

Price is the only community in the area with a hospital (Carbon County Hospital). The facility is licensed and accredited for 70 beds; there are nine medical doctors. The hospital has an occupancy rate of

53 percent which reflects an average admission of 28 persons per month. The hospital treats about 1,300 emergencies per month. About 100 persons are employed at the hospital. All towns in Emery County use the Carbon County hospital.

There are no hospitals in Emery County. Huntington has one doctor and an outpatient clinic. Castle Dale has a clinic with one emergency bed; a doctor flies in once a week from Provo. Emery Town and Ferron have no clinic or doctors, and residents must travel as far as 23 miles north to Castle Dale for medical treatment.

There are six dentists in Price and one in Castle Dale and one in Helper. There are no dentists in other communities in Castle Valley.

d. Quality of Life

Quality of life includes the everyday availability of goods and services, as well as the morale and attitudes of the people. An attitudinal survey in which 255 residents responded was conducted in Carbon and Emery counties (Albrecht, 1975). The study focused on personal and community satisfaction, availability of goods and services, and perceived impacts of energy development. Albrecht's work pointed out that a majority of Carbon and Emery county residents have lived in the area most of their lives and over 85 percent indicated great reluctance to leave. The data indicated that over 50 percent of the Carbon and Emery county residents are very satisfied with their communities, perceiving them as choice places to raise their families. However, the respondents recognize the lack of important social services and economic opportunities.

The survey questionnaire asked persons to rank important advantages of energy development. The persons surveyed felt the advantages

were mostly economic. The most frequent response was "job and employment opportunities," second was "general community development," and third was "increase in local business and economic stabilization." Most residents of the area recognize possible trade-offs between having economic opportunities and living in a small town atmosphere. Energy development in their own area had a positive connotation for the people surveyed.

13. Human Health and Safety

a. General

Major highways in the area of the proposed project are State Highways 10 and 33, and U.S. Highways 50 and 6. Traffic flows and a 3-year average for accidents and fatalities are shown in Table 2-25.

Noise levels of diesel trucks traveling at normal highway speeds (55 miles per hour) vary from 85 decibels to 55 decibels at a 50-foot distance.

TABLE 2-25

Traffic Flow, Accidents, and Fatalities on Highways in Project Area

Highway	Vehicles Per Day	Accidents[a]	Fatalities[b]
U 10	1,100	2.39	0.43
U 33	400	7.22	0.40
US 50 & 6	5,000	3.12	0.41

Source: Utah Highway Department, 1975.

[a]3-year average (per million passenger miles).

[b]3-year average (per million passenger miles).

b. Specific

(1) Mine Accident Rates

Mine safety is a continuous problem, particularly underground, due to methane gas, ventilation problems, fire, explosion hazard, and roof collapse. Since 1910, when the first mine safety records were prepared, the number of mine fatalities has declined. In 1910, the fatality rate for the United States was slightly over 2 deaths per million man-hours worked; in 1970 the rate was 0.04 deaths per million man-hours (Gouse and Rubin, 1973). The mine construction activities at the Wilberg Mine meet Mining Enforcement and Safety Administration standards.

(2) Plant Construction Hazards

The major human hazard during plant construction is falling from the structure. One fatality occurred during construction of the Huntington generating complex. To date there has only been one accident at the Emery site - a falling injury.

Sound levels at the construction site will occasionally reach 100 decibels; however, the noise level and duration do not exceed Occupational Safety and Health Administration standards.

(3) Provo Transmission Line Segment

In the Provo City area of the proposed transmission line corridor there are 3.6 miles of freeway (I-15), two freeway interchanges, about 2,900 feet of access roads, and approximately 6 miles of residential-agricultural lands. The population of the immediate area (census tract 22) was 2,534 in 1970 (Bureau of Census, 1973).

14. Market Area

a. Geographic Area

The territory UP&L provides with electrical energy covers southeast Idaho, most of Utah, and a portion of southwestern Wyoming (Figure 1-6). This service area covers 82,000 square miles with a population of 1.25 million people. The two units proposed at Emery would provide for normal load growth plus firm commitments over the entire service area.

Major commitments are: preference customers Wasatch Front municipalities, 59 MW; Moon Lake Rural Electric Association, 52 MW; Kennecott Copper Company, 50 MW; California Pacific Utilities, 46 MW; Anaconda Copper Company, 50 MW; and Agricultural Products Company, 16 MW. All of these users are located in Utah except the Agricultural Products Company and California Pacific Utilities. Agricultural Products is located in Soda Springs, Idaho, and California Pacific is in northern Nevada.

The description of the market area includes only communities or users along the Wasatch Front. Power consumption (market area interrelationships) of a fertilizer manufacturing plant owned by Agricultural Products Company, is being considered in the Southeastern Idaho Phosphate EIS, currently being written by USGS. Power consumption in northern Nevada is for normal load growth and is spread over such a large area that discussion of that market area would be too expansive for this statement.

b. Population

The major population center of Utah lies along the Wasatch

Front. The area is composed of four counties which have been designated as Standard Metropolitan Statistical Areas (SMSA). The population of the SMSA counties (Weber, Davis, Salt Lake and Utah) is 920,000 or 87 percent of the population of the State of Utah (Bureau of Census, 1970). This population concentration is reflected as number of persons per square mile:

County	Persons Per Square Mile
Weber	217.3
Davis	333.4
Salt Lake	600.3
Utah	68.4

In 1974, Tooele County had a population of 23,000 with 90 percent living in Tooele Valley.

c. Employment

The Utah civilian labor force averaged 501,600 during 1974 with 471,600 employed and 6.0 percent unemployed. Despite fluctuation in the national employment scene, the Utah nonagricultural job total has been one of substantial growth, particularly in recent years. The number of employees on nonagricultural payrolls between 1960 and 1974 grew at a rate of 3.7 percent a year. Approximately 93 percent of total employment is in nonagricultural sectors.

d. Manufacturing

In 1974, Utah manufacturing firms employed 69,279 workers and paid more than $636,000,000 in wages. Large concerns, such as Kennecott Copper Corporation, United States Steel Company, and other firms in the primary metals industry, paid approximately 20 percent of the total

$636,000,000. In addition to primary metals, significant segments measured by value added in 1972 were: food processing ($142,900,000); machinery, except electrical ($115,900,000); transportation equipment ($141,000,000); and fabricated metal products ($69,300,000).

e. Mining

Mining has always been fundamental to Utah's economic well-being. Utah ranks among the 10 leading states in proportion of income and employment derived from mining and processing of minerals. Although mining employment has decreased 4 percent since 1960, the value of Utah mineral production has steadily increased, ranking Utah 15th in the Nation in 1973. Since 1940, there has been a general expansion in the production of metals and other minerals.

C. PROBABLE FUTURE ENVIRONMENT OF PROJECT AREA WITHOUT PROPOSAL

1. Projected Levels of Employment, Population, and Community Services

Past downward trends in population would continue to reverse due to pressures for coal development, the federal drive for energy self-sufficiency, and a demand for low sulfur coal. Coal mining and power generating companies are currently expected to bring 4,741 new mining employees to the Carbon-Emery area by 1979 (not including those associated with construction and service employment).

a. Population

The rapid population growth that has occurred over the past 5 years in Castle Valley is expected to continue. Figure 2-32 indicates a continual population growth of about 6 percent per year without the

Emery project. Coal demands are expected to continue and a supply would undoubtedly come from mines in the Castle Valley area. Increased coal mining would also bring about an increase in the population. National demand for uranium is expected to rise, and more people would be needed in the Castle Valley area for this industry. Expansion is also anticipated in railroad construction and tar sand development. McCulloch Oil Corporation (Braztah-Carbon fuel operation) plans to mine 6,500,000 tons of coal per year at Castle Gate by 1982, and to employ at least 1,900 persons. This development alone would add a direct work force population impact of approximately 5,700 people.

b. Economic and Growth Trends

Coal mine development could become intense, as indicated in Table 2-26. Small towns in the area cannot comfortably handle accelerated growth above 5 percent without increased taxes, housing, and public facilities. A considerable lead time to plan for such growth and to attract outside investments would be required (DRI, 1974).

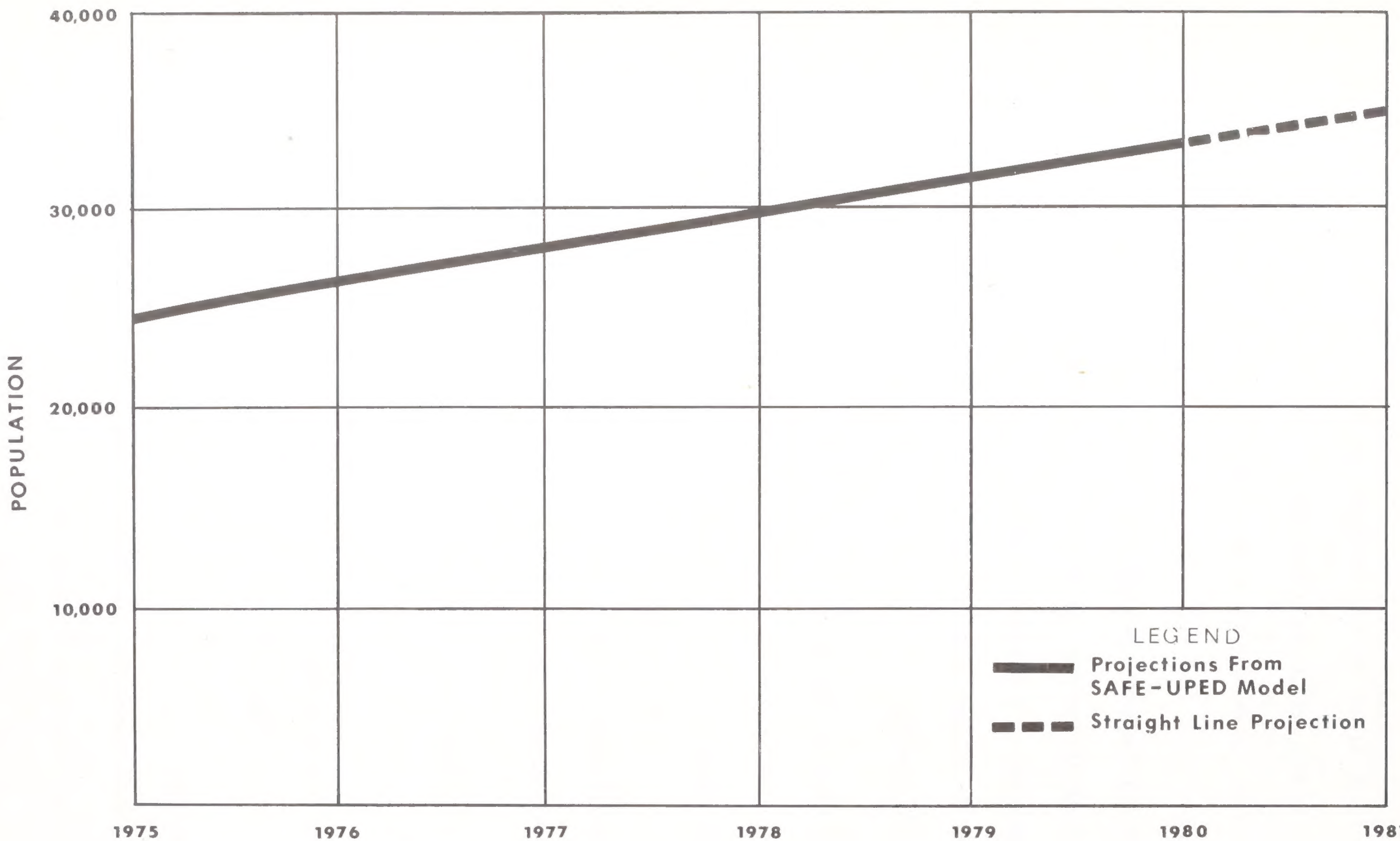
2. Projected Land Uses

a. Ownership

Land ownership (federal, state, or private) will remain essentially unchanged in the Carbon-Emery area.

b. Livestock Grazing

Grazing practices in the Carbon-Emery area are generally regulated by federal programs on national resource and U.S. Forest Service lands. It is not anticipated that there will be any major changes in these programs in the foreseeable future.



Source: SAFE-UPED Model 1975

FIGURE 2-32

PROJECTED POPULATION IN CASTLE VALLEY WITHOUT EMERY GENERATING COMPLEX

TABLE 2-26

Coal Mine Employment Forecast
Carbon and Emery Counties

Companies	Number of Employees 1974-1975	1976-1977	1978-1979	1980-1981	1982-1983	1984-1985
Carbon County						
Kaiser Steel	575-700	700	700	700	700	700
US Fuel	183-250	250	250	300	300	300
Carbon Fuel	105-450	1,050-1,275	1,500-1,600	1,700-1,800	1,900-2,000	2,150-2,200
Plateau Mining Company	87-220	330-480	600	600	600	600-650
Valley Camp Coal	3-180	200-270	300	300	300	300
Calif. Portland Cement	0-80	120	120	180	180	180
Swisher	41-44	54-59	63-74	84-86	92-97	99-100
US Steel	0-50	50	50	50	50	50
TOTAL	1,444-1,974	2,754-3,204	3,583-3,692	3,914-4,016	4,122-4,227	4,379-4,480
Total New Emloyees	530	1,760	2,248	2,572	2,783	3,036
Emery County						
American Coal	130-230	270-300	300	300	300	300
Peabody Coal	105-400	420-450	475-500	885	935-985	1,018-1,035
Browning Coal	36-200	200	200	200	200	200
US Steel	322-300	300-325	325	325	325	325
Sun Valley Coal	5	5	5	5	5	5
Coop Mining	5-28	28	28	28	28	28
Utah Power & Light[a]			250	500	500	500
Arizona Public Service				250	250	250
Total	603-1,163	1,223-1,308	1,582-1,608	2,493	2,543-2,593	2,618-2,643
Total New Employees	560	705	1,005	1,890	1,990	2,040
TOTAL NEW EMPLOYEES TWO COUNTY AREA	1,090	2,465	3,253	4,462	4,773	4,676

[a] For Huntington Units not Emery Units.

c. Mineral Activities

Coal production will continue to increase with current firm out-of-state commercial demands and markets. Land use changes for coal production would be insignificant.

d. Agriculture

Small farm acreages will continue to be cultivated. However, overall agricultural acreage may decline in the future due to conflicting uses and demands for irrigation water.

e. Urban

Projected land use for industry and community development is estimated at an additional 1,500 acres in Carbon County and 500 acres in Emery County by 1980.

f. Transportation

Improved transportation facilities in the area will continue to develop, but new land acreage requirements will be minimal. Existing roads would be upgraded and improved.

3. Projected Cultural Factors

It is anticipated that the influence of the Mormon culture would diminish with the influx of new people. It is also likely that some individuals in the present population would be attracted to new cultural values. Some present inhabitants may leave their traditional employment in agriculture and work in the growing, more lucrative, energy industry.

Urbanization and secularization should result in the affected

counties. The area would most likely change to a more impersonal way of life and there would be an increase in formal social organization (American Guide Series, 1958).

The quality of the outdoor experience (i.e., hunting and fishing) would decrease.

4. Projected Vegetation and Wildlife Resources

The probable future environment were the proposed development not to occur has been analyzed with reference to the area which would be directly affected by the project. Increased coal development with attendant population increases in Carbon and Emery counties would likely reduce the quality and quantity of both vegetative and wildlife resources in the future.

Current trends in urban expansion would likely cause a large area of open land conversion to housing, streets, and related development. As a result, the natural productive level of vegetation would be lost for livestock and wildlife use. Increased populations would create greater demands for recreational activities such as hunting, fishing, hiking, sightseeing, and off-road vehicle use. The increased visitor use of the area would probably lead to greater levels of game animals harvested, and of harassment to wildlife with resulting losses.

There is an upward trend in illegal activity relating to wildlife resources in the area. Numbers of wildlife citations issued in the Carbon-Emery area have increased 41 percent from 1973 (105 citations) to 1974 (148 citations). Figures are not available for 1975, but a significant increase in violations has occurred (UDWR, 1976a).

3

CHAPTER 3

THE ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

D. GEOLOGY AND TOPOGRAPHY

1. Mine Site

On East Mountain, above the coal mine, subsidence (sinking) could occur on 2,578 acres of U.S. Forest Service land and 2,080 acres of privately owned land, which is the area covered by the coal lease (USGS, 1976a). The location where subsidence would be expected to occur on the entire Wilberg lease area is shown in Figure 2-6. Subsidence occurs as the roof collapses into the spaces created after coal is mined. It cannot be determined exactly how much subsidence could occur, but it could be as much as 10 feet (Brauner, 1973).

Subsidence could occur within days after mining a particular portion of the mine, or many years after abandonment of the mine (National Academy of Science, 1975).

Subsidence could affect land use, water resources, and human safety, although the magnitude, duration, and insidence of this impact is presently unknown.

2. Transmission Lines

Construction of the Emery-Spanish Fork Canyon-Camp Williams and Emery-Salina Canyon-Sigurd transmission lines may cause landslides on unstable slopes. The slopes most likely to be impacted are located between the Scofield Reservoir and Gilluly along the Emery-Spanish Fork Canyon-Camp Williams line (mile 46 to 57, profile map, Appendix VI-3). and between Browns Hole and Oak Ridge on the Emery-Salina Canyon-Sigurd line (mile 51 to 53 Appendix VI-4). The transmission lines would be constructed through potentially unstable areas. However, considering

the small amount of acreage involved and the fact that transmission line routes actually pass along reasonably stable portions of these areas (USDI, BLM, 1975), it is estimated that the overall magnitude of the impacts would be insignificant.

E. SOILS

1. General

The people moving into the Castle Valley area as a result of the Emery project would increase off-road vehicle (ORV) use in the Castle Valley and San Rafael areas of Carbon and Emery counties. The ORV activity would increase by 12 percent, or 11,000 visitor days, by 1981 at which time the plant would be in full operation. Presently, 25 percent or 2,800 visitor days of this increased ORV use is occurring as plant construction continues. (It is calculated that the Emery project would increase the population of Carbon and Emery counties by 12 percent in 1981. The 11,000 visitor-day increased ORV use caused by Emery was determined as 12 percent of the total ORV use that would occur in Carbon and Emery counties in 1981 [Williamson, 1976]).

The soils in these areas have a sparse vegetative cover and are subject to wind and water erosion with the slightest disturbance. The ORV tracks remain for years in these soils. During periods of rainfall or runoff, water accumulates and runs in these tracks. The ruts act as drainage courses, and erosion is accelerated in them. The ORV ORV destroys the structure and stability of the soils, loosening individual particles which are then moved by the action of the wind. The significance of these impacts in terms of soil loss is impossible to quantify

as it involves 2,500,000 to 3,500,000 acres in Castle Valley and the San Rafael Swell areas of Carbon and Emery counties. This soil loss would affect vegetative productivity, and would continue as long as the work force for the project is present. Soil losses are irreplaceable.

2. Specific

The productivity of approximately 2,137 acres of soil would either be reduced or lost as a result of construction activities and the resultant structures occupying the surface. Tables 3-6 and 3-7 show the total acreage removed or disturbed per project component. Surfaces to be covered by structures, including buildings, roads, etc., would amount to a loss of potential productivity on an estimated 1,788 acres of soils. (Presently, 1,506 acres of soil at the plant site have been disturbed as permanent structures are being constructed.) Loss of soil productivity on the 1,788 acres would continue for the life of the project and would be irreplaceable. The impacts of this loss of soil productivity would affect vegetative productivity, but the loss would have a local effect since 1,591 of the 1,788 acres occupied would be in Emery County.

In addition to the acreage occupied, a number of acres would be disturbed during the construction of transmission lines, access roads, the land clearings, and cut and fill operations. Before complete rehabilitation occurred, either by natural or artificial means, this disturbance would result in increased erosion and loss of vegetative production.

The potential for increased erosion hazard would be especially high for soils having a high erosion hazard and a low probability of

TABLE 3-6

Erosion Hazard on Areas Disturbed by Project Components

Project Component	Erosion Hazard (acre) Low	Moderate	High	Total (acres)
Generating Complex		1,000	1,000	[a]2,000
Disturbed		0	0	0
Occupied		753	753	1,506
Coal Source and Surface Facilities			100	[a]100
Disturbed			42	42
Occupied			58	58
Coal Haul Road		19	20	[a]39
Disturbed		2	2	4
Occupied		8	8	16
Water System - Millsite Reservoir Pipe Line		6	27	[a]33
Disturbed		4	18	22
Occupied		2	9	11
Emery-Spanish Fork Canyon-Camp Williams	637	706	473	[a,b]1,816
Pads				
Disturbed	26	29	19	74
Occupied	18	19	13	50
Roads [c]				
Disturbed	7	14	8	29
Occupied	--	--	--	29
Emery-Salina Canyon-Sigurd	126	622	245	[a,b]993
Pads				
Disturbed	10	51	20	81
Occupied	7	34	13	54
Sigurd-Camp Williams	316	1,544		[a,b]1,860
Pads				
Disturbed	16	81		97
Occupied	11	53		64
Total Acreage	1,079	3,897	1,865	6,841
Total Disturbed	59	181	109	349
Total Occupied	36	869	854	1,788

[a]Represents acreage of each project component (See Soils Section, Chapter 2).

[b]Figure represents total acreage in Right-of-Way.

[c]Forty miles of access road (12 foot) of which 20 miles will be closed. The location of the 20 miles to be left open is not known.

TABLE 3-7

Probability of Success for Rangeland Seeding on Areas Disturbed by Project Components

Project Component	Probability of Success (acre) Less than 30%	30-50%	50-70%	Greater than 70%	Total (acre)
Generating Complex	2,000				[a]2,000
Disturbed	0				0
Occupied	1,506				1,506
Coal Source and Surface Facilities	100				[a]100
Disturbed	42				42
Occupied	58				58
Coal Haul Road	29		10		[a]39
Disturbed	3		1		4
Occupied	12		4		16
Water System-Millsite Reservoir Pipe line	27		6		[a]33
Disturbed	18		4		22
Occupied	9		2		11
Emery-Spanish Fork Canyon-Camp Williams	577		95	1,144	[a,b]1,816
Pads					
Disturbed	24		3	47	74
Occupied	16		3	31	50
Road[c]					
Disturbed	8		4	17	29
Occupied	--	--	--	--	29
Emery-Salina Canyon-Sigurd	576		103	314	[a,b]993
Pads					
Disturbed	46		10	25	81
Occupied	31		6	17	54
Sigurd-Camp Williams	32	268	1,260	300	[a,b]1,860
Pads					
Disturbed	2	14	65	16	97
Occupied	1	9	44	10	64
Total Acreage	3,341	268	1,474	1,758	6,841
Total Disturbed	143	14	87	105	349
Total Occupied	1,633	9	59	58	1,788

[a]Represents acreage of each project component.

[b]Figure represents total acreage in Right-of-Way.

[c]Forty miles of access road (12 foot row) of which 20 miles will be closed. The location of the 20 miles to be left open is not known.

success for range land seeding (less than 50 percent). These soils are mainly located in lower desert areas and in the surrounding foothills and badlands. Of the 349 acres that would be disturbed (Tables 3-6 and 3-7), 109 acres with a high erosion hazard, plus 48 acres with a low to moderate soil erosion hazard, have a low probability of success of range land seeding (less than 50 percent). Appendix VI-1 through VI-7 shows location of these soils.

After disturbance had occurred and until rehabilitation takes place, soil erosion would increase as the natural cover of vegetation, which protects the soils, is removed. Water resources would be affected by increased sediment yield. Of the 349 acres that would be subjected to erosion, 107 acres are located in the highly erodible San Rafael River drainage. Ten miles of transmission lines cross this drainage. It is estimated that the drainage area affected would have an increase in sediment production by 180 tons annually. This increase seems insignificant, however, when compared to the present 510,777 tons of sediment produced annually in the drainage area. Soil loss on the remaining 247 acres cannot be determined because of the number of drainages involved and because the disturbance would occur over the remaining 289 miles of transmission line corridor. In essence, only 0.4 acre per mile would be disturbed. Erosion would occur until vegetative rehabilitation - estimated to take as long as 20 years - is complete.

F. VEGETATION

1. General

Considerable concern has been expressed over the acute effects

of SO_2 and a combination of SO_2 and NO_2 acting together on vegetation. Studies indicate SO_2 concentrations of about 0.5 p/m for 3 hours were required to cause injury to the most sensitive species when combined with an equal amount of NO_2 (Bennett and Hill, 1973; Hill, et al., 1974). These data appear to be consistent with the present secondary NAAQS established for the protection of soil, water, and vegetation. Calculated SO_2 levels are a factor of approximately two to three below these standards. Equivalent NO_2 concentrations predicted would be 0.37 p/m, assuming all nitrogen oxides were converted to NO_2. Under such conditions, little impact would be expected on vegetation.

Although concentrations of SO_2 and NO_2 would not be expected to harm vegetation in the Castle Valley area, very little is known about the cumulative or chronic long-term exposure of vegetation to these compounds. However, studies conducted since 1963 at the Four Corners and San Juan power plants indicate that no visible damage has occurred to vegetation from these pollutants (Hill, et al., 1974a).

Off-road vehicle activity is predicted to increase by 12 percent (11,000 visitor days) in the Carbon and Emery county areas. Much of the activity is expected to occur on the San Rafael Swell. Fifteen threatened and endangered plant species have been identified (Appendix VII-2). An additional 12 plant species that occur on the Swell have been considered for inclusion on the threatened and endangered list. The increased ORV use may damage or destroy a number of individual plants classified as threatened or endangered, an entire species, or their critical habitat. The significance of the impact cannot be determined, as studies have not been conducted to ascertain the exact location or

range of these plant species on the Swell. Loss of any of these plant species or damage to their critical habitat would be irreplaceable to national scientific-educational values, and aesthetic-recreational importance.

2. Specific

Construction of the proposed project would result in the disturbance or elimination of vegetation on 2,137 acres, of which 1,788 acres would be permanently occupied (Table 3-8). Presently, vegetation on 1,506 acres at the generating complex has been removed. The loss of vegetative production would affect wildlife habitat through loss of food and cover, and would affect land use through loss of livestock forage and crop lands. In addition, the removal of vegetation would impact aesthetics along the transmission lines.

The acreage would be permanently occupied for the lifetime of the generating complex, thus eliminating the production of vegetation for that period. The loss of this vegetative production would be irreplaceable, but of local importance only, considering that, of the 1,788 acres that would be occupied, 1,591 acres would be located in Emery County.

Of the 2,137 acres involved with the project, 349 acres would not be occupied by structures (Table 3-8). Vegetative production on this acreage would be lost. Wildlife habitat would be affected through loss of food and cover, and soils would be affected by removal of the natural cover, exposing the soils to increased erosion. The loss of this vegetation would persist until rehabilitation could occur - in an estimated 10 to 20 years. This loss would be of local significance

TABLE 3-8

Vegetation Types Affected by Project

Project Component	Agricultural	Aspen	Grassland	Greasewood	Mixed Conifer	Mountain Brush	Pinyon-Juniper	Riparian	Saltbush	Saltgrass	Sagebrush	Annuals	Total
	Vegetative Communities Affected (acre)												
Generating Complex	800			320				100	700	80			[a]2,000
Disturbed	0			0				0	0	0			0
Occupied	592			237				100	518	59			1,506
Coal Source and Surface Facilities							100						[a]100
Disturbed							42						42
Occupied							58						58
Coal Haul Road	30			5				2	2				[a]39
Disturbed	3			1									4
Occupied	12			2				1	1				16
Water System-Millsite Reservoir Pipe Line	12			6				1	11	3			[a]33
Disturbed	8			4					8	2			22
Occupied	4			2				1	3	1			11
Emery-Spanish Fork Canyon-Camp Williams	431	110	67	16	31	315	315	77	158		296		[a,b]1,816
Pads													
Disturbed	19	4	3		1	13	13	3	6		12		74
Occupied	13	3	2	1	1	8	8	2	4		8		50
Road[c]													
Disturbed		6	1		2	3	4	1			12		29
Occupied													29
Emery-Salina Canyon-Sigurd	116			32	157	32	127	63	309		157		[a,b]993
Pads													
Disturbed	9			2	15	2	12	5	23		13		81
Occupied	6			2	6	2	8	3	17		8		54
Sigurd-Camp Williams	284					32	205		79		1,134	126	[a,b]1,860
Pads													
Disturbed	15					2	11		4		58	7	97
Occupied	10					1	7		3		40	3	64
UP&L Land Outside Generating Complex	800			156				65	343	66			1,430
Total Acreage	2,473	110	67	535	188	379	747	308	1,602	149	1,587	126	8,271
Total Disturbed	54	10	4	7	18	20	82	9	41	2	95	7	349
Total Occupied	637	3	2	244	8	11	81	107	546	60	57	3	1,788

[a]Represents acreage of each project component (see Vegetation Section, Chapter 2).

[b]Figure represents total acreage in Right-of-Way.

[c]Forty miles of access road (12 foot) of which 20 miles will be closed. The location of the 20 miles to be left open is not known.

only. Of the acreage affected, 107 acres would be in Emery County with the remaining 247 acres spread over 284 miles of transmission corridor.

Based on existing data no threatened or endangered plant species would be impacted by construction of the project facilities.

G. WATER RESOURCES

1. General

Domestic waste water amounting to 508,500 gallons would be produced each day after 1981 following the increase in population to 5,085. The 508,500 gallon figure assumes that the average requirement for waste water treatment is 100 gallons (0.0003 acre-feet) per capita per day (VTN, 1975a). At present, 25 percent or 127,125 gallons per day (0.34 acre-feet) of this increase is being made.

Approximately 50 percent of the population influx would reside in the Price area. At present, Price City could accommodate 5,000 additional people with its present sewer treatment capacity. However, additional sewer lines would have to be built (VTN, 1975a). Together, the Castle Dale and Orangeville sewage systems could service 3,000 additional people (VTN, 1975a).

The towns of Emery and Ferron presently do not have a sewer system; disposal is by septic tanks and drain fields. It is calculated that these towns together would receive less than 3 percent (135 persons) of the total population influx (VTN, 1975a). This influx would increase the waste water discharge by 13,500 gallons per day (0.04 acre-feet), an increase of 15 percent. In all probability septic tanks and field drains would be utilized for the disposal of waste water. The placement

of septic tanks and drain fields falls under the authority of the Utah Department of Health and it is not expected that impacts to surface water resources would occur. Were an impact to occur, it would be in the form of reduced water quality by adding to the dissolved solid (salt) content. The salt would not impact game fisheries since none exist downstream from these towns.

The influx of 5,085 workers and service personnel (and their families) by 1981 would increase the demand for domestic water. Quantities of additional water needed have been estimated at 1,322 to 1,729 acre-feet per year. This figure was calculated by assuming that 0.26 to 0.34 acre-foot of water per capita year would be required (VTN, 1975a). At present, 25 percent, or 330 to 432 acre-feet, of this demand has been experienced. Approximately 340 to 506 acre-feet per year of additional water could be supplied from the Ferron, Cottonwood, and Huntington creek drainages. The remainder (982 to 1,223 acre-feet) could be acquired from springs on the Wasatch Plateau and from the Price River (City of Price domestic supply). To meet the demand for domestic water from Ferron, Cottonwood, and Huntington creek drainages, approximately 97 to 145 acres of land in Emery County would be retired from irrigation as the water requirement is changed from agricultural to domestic use.

It has been estimated that about 320 tons of dissolved solids would be added to the Colorado River system each year as a result of off-the-job recreational and domestic activities of the new people associated with the project (VTN, 1975a). The 320 tons of dissolved solids (salt) would be slight compared to the 8,000,000 tons that flow out of the upper Colorado River Basin each year.

The consumptive use of 7,000 acre-feet of Ferron Creek runoff would remove about 2,360 tons per year of dissolved solids from the Colorado River system during the life of the project. The change in use of 7,000 acre-feet per year from agricultural to industrial would result in the removal of 1,785 acres from irrigation and would eliminate another 5,710 tons of dissolved solids (Iorns, et al., 1965).

The two power units would divert approximately 7,000 acre-feet of good quality water from the Cottonwood Creek tributary of the San Rafael River basin annually. The diverted water would not be available for irrigation of agricultural land. The result of this water not being used for irrigation would be a reduction of the salinity of the Colorado River at Lee's Ferry of 0.5 to 0.6 p/m (Vaughn Hansen and Associates, 1976).

The change in water use from agricultural to industrial would reduce annual return flows from irrigation into the San Rafael River drainage by approximately 5 percent (4,000 acre-feet) (Utah Division of Water Resources, 1976). This reduction would not affect any down stream users in the San Rafael drainage since there would still be sufficient supplies. The annual loss of this 4,000 acre-feet of water would mean a reduction in flow at Lee's Ferry of approximately 2,000 acre-feet. (Approximately 2,000 acre-feet of the total would be lost upstream through evapotranspiration [Iorns, 1965].) The loss of this 2,000 acre-feet of water would mean a descrease of 0.15 percent in the total flow of the Colorado River at Lee's Ferry.

In relation to the Colorado River compact, this 7,000 acre-feet has been appropriated by diligence and decreed water rights upstream. In other words, users of this water are entitled to the entire 7,000

acre-feet by law and are not required to let any of it flow downstream. Therefore, the use of this water for industrial use has no affect on the Colorado River Compact (Williamson, 1976).

Further, change in use of from 340 to 506 acre-feet per year from agricultural to domestic would result in the removal of 87 to 129 acres from irrigation and would eliminate another 278 to 413 tons of dissolved solids.

With the increase of 320 tons per year of dissolved solids resulting from the population increase, the net decrease of dissolved solids (salts) to the Colorado River system would be about 8,028 to 8,163 tons per year (VTN, 1975a). As the average annual salt load of the Colorado River at Lees Ferry is nearly 8,000,000 tons per year, it would appear that effects of the 0.1 to 0.12 percent decrease would not be significant (USBR, 1975b).

2. Specific

About 90 acre-feet per year of drain effluent is currently being discharged into Rock Creek. Flow data and water analyses supplied by UP&L (1976), indicate there has been no measureable decrease in water quality in Rock Canyon Creek as a result of this discharge.

Minute quantities of trace elements from stack emissions would be deposited on the surrounding terrain during the life of the power plant. Considering the low emission levels, the high potential for deposition over wide areas, and the small number of flowing streams and shallow water in the area, the possibilities are low for significant concentrations to occur in any particular area.

Subsidence following mining operations could intercept ground

water aquifers above the mining areas. This disturbance of geologic formations could alter both the ground water and surface water regimes. Springs, including nine that have been measured, could be affected with the possible loss of over 180 acre-feet per year of surface discharge. This subsidence could also eliminate stream flow in reaches of Roan Canyon, Deer Creek, and in the headwaters of Grimes Wash. Estimates of the magnitude of impacts are unavailable for these three drainages. Similarly, water levels at Snow and Flag lakes might change because of mine subsidence. Predictions of whether water levels would be raised or lowered by the changes cannot be substantiated.

Reduction or changes in water sources could affect livestock grazing which is dependent on these waters. Impact to wildlife is unknown as they are more mobile than livestock and may find water elsewhere.

Construction of linear features of the project (coal haul roads, water supply pipe lines, and power transmission lines) would cause an increase in surface water runoff with resultant sedimentation in washes and streams. Disturbance of vegetation and soil would affect watershed characteristics associated with the control of surface runoff and sediment yields. Although the magnitude of such impacts cannot be estimated, it is likely that accelerated runoff would continue until vegetation is reestablished or until soils are otherwise stabilized (Tables 3-6 and 3-7).

H. WILDLIFE

1. Aquatic Wildlife

As a result of the population influx, a 12 percent increase in visitor days (16,000) for fishing would occur by 1981 upon completion of

construction of the generating complex. This figure was calculated assuming that 41 percent of the population would go fishing. Approximately 5,000 visitor days of the 16,000 increase is attributed to juvenile nonlicensed anglers (UDWR, 1973). Further, it was calculated that the demand for game fish would increase to 37,000 annually (UDWR, 1973). At present, 25 percent (or 4,000 visitor days) of the 12 percent expected increase from Emery is already occurring (UDWR, 1976f). This increased fishing pressure could reduce game fish numbers (rainbow and cutthroat trout) in the following waters: Joes Valley, Scofield, Huntington North, Gooseberry, Miller Flat, Cleveland, Petes Hole, Ferron, Millsite and Electric Lake reservoirs; on the upper Price River (Lower Fish Creek); and at the Lowry, Huntington, and Cottonwood creeks (UDWR, 1976f). Most fish harvested would be those species planted (rainbow trout) by the UDWR as fingerlings and catchables. This reduction in trout numbers, unless augmented with additional stocking, would affect recreation.

The upper part of Huntington Creek, the Upper Price River, and Cottonwood Creek support German brown trout. Brown trout are a species capable of maintaining adequate population levels under heavy fishing pressure. It is not expected that the German brown trout in these waters would be over-fished. However, fishing would become more competitive and less rewarding to the anglers.

Cottonwood Creek would be crossed by a bridge for the proposed coal haul road. Also, the coal mine in Grimes Wash would bring about additional activities in the Cottonwood Creek drainage watershed that could increase erosion and cause increased sediment loads in the creek. However, all impacts would occur below the irrigation diversion works.

The brown trout fishery is located above the diversion works and would not be impacted.

2. Unique and Uncommon Species

As discussed in Chapter 2, the moose herd is being depleted by the present population; an average four head are lost annually through illegal kills. Although the population increase from the project would not eliminate the moose herd by illegal kills, it would cause added pressure on the herd.

The sightings of Canada lynx and river otter are too infrequent to form a basis to determine impacts resulting from the project.

3. Feral Animals

Increased recreational activity in the San Rafael Swell and adjacent areas would increase harassment of wild horses and wild burros. Activities such as horse and burro chasing by ORV users during the foaling season could cause minor reductions in existing populations (estimated at 1 percent or less).

4. Threatened and Endangered Species

Sightings of the endangered American peregrine falcon in the area of the generating complex are too infrequent to form a basis for determining impacts that could result. The proposed transmission line near Provo Bay and Powell Slough in Utah County would be a flight hazard to peregrine falcons hunting in those areas. The possibility exists that a peregrine could collide with a tower or conductor during pursuit of prey. The extent of loss from such occurrances would be small, but because few remain, any loss would be significant. The proposed

transmission lines would add a small increment to the hazards already imposed by the present power and communication lines, radio towers, fences, residential sections, and roads in the area.

There are no species in the project areas classified as threatened under the Endangered Species Act.

5. Terrestrial Wildlife

The increase in population would contribute to loss and harassment of wildlife. A loss would result when human activities displace the animals from favorable habitat, since surrounding areas may not offer support. Although the additional number of people in the area would adversely affect the wildlife species and their habitat, the increase would be only 12 percent of the total population increase that would occur by 1981 in Carbon and Emery counties. Presently, there are insufficient data to evaluate the impacts as they apply to the Emery project. The impacts, however, would extend throughout the life of the project.

Construction of the generating complex and the retirement of farm lands west of the complex would remove 1,600 acres of agricultural land and 100 acres of riparian vegetation which support pheasant habitat. By removing small grains and alfalfa on agricultural lands, food and cover for this species would be lost. Loss of habitat would reduce pheasant numbers by approximately 240 cocks, 200 breeding hens, and 920 young, annually. These losses are based on an average of 12 hens per 100 acres, a 61 percent cock harvest, a 2.8 hens to cock post-season ratio, and a 45 percent winter mortality of hens following the close of the season. With average production, these hens would produce 54 young

per 100 acres by late July (UDWR, 1976c).

A four percent decrease in pheasant habitats and a similar decrease in pheasant numbers would occur in Emery County. The impact would exist for the lifetime of the project, but would be of local concern since only Emery County would be affected. The recreational opportunities for pheasant hunting would be reduced.

If springs in the lease area were to dry up as a result of subsidence, it is probable that elk could be affected. Without their watering source, the elk would be forced to locate on other summer ranges that would provide water. However, other ranges are currently at carrying capacity and it is possible that the displaced elk would be lost. Insufficient data for the area above the Wilberg Mine precludes evaluation of actual impacts on elk.

In addition, small mammal and passerine bird numbers could be reduced in the immediate vicinity of springs that might dry up as a result of subsidence. The number of mammals and birds lost and the effect of this loss on the total population on East Mountain is not known. However, the area where these species could be impacted represents approximately 15 to 20 percent of the total land area on East Mountain.

Construction of the coal storage facilities, coal haul road, and development of the mine would destroy 100 acres of deer winter range (UDWR, 1976e). Another 520 acres would be affected by noise and constant human activity associated with project components and would become unusable for deer winter range (UDWR, 1976e). The 520 acre figure was based on the assumption that deer would be driven approximately 0.1 mile from the project facilities. The area thus affected would be from the

coal mine down Grimes Wash about 3 miles (Appendices VI-1, VI-2). The amount of winter range is the limiting factor for deer, and deer forced from the area would be lost since other areas would be already occupied.

The loss would be 620 acres representing a total loss of 1 percent of all deer winter range adjacent to the Wilberg Mine.

According to the Utah Division of Wildlife Resources data (1976e), the area in Grimes Wash receives very little deer use. For the last 4 years data has not been collected on deer in the area. Using information collected in 1970 through 1972, the average number of deer-days use per acre was seven. This would mean that approximately eight deer and resultant reproduction would be lost from the 620 acres, representing a 1 percent reduction in herd size and a 1 percent reduction in annual harvest (three deer). The loss would be 0.0001 percent of the deer harvested in the State of Utah during 1975.

The Emery-Spanish Fork Canyon-Camp Williams transmission line would pass through deer and elk winter range between the north fork of Gordon Creek and U.S. Highway 89 (mile 35 to 80, Appendix VI-3) and between Saleratus Creek and Lost Creek (mile 30 to 65, Appendix VI-4) on the Emery-Salina Canyon-Sigurd line. The disturbance of this habitat during the winter months (January 1 to April 30) would drive deer and elk from their habitat. Animals thus displaced would be lost since other wintering areas would be at carrying capacity and would not support additional numbers. There are insufficient data to quantify winter range habitat affected and deer and elk lost. If construction took place during the winter, loss of habitat would occur only during the time required for transmission line construction.

The Emery-Spanish Fork Canyon-Camp Williams transmission line would also pass through deer-fawning and elk-calving areas between Beaver Creek and Soldier Creek (mile 40 to 55, Appendix VI-3). The Emery-Salina Canyon-Sigurd line would pass through an elk-calving area between Flat Top Mountain and Oak Ridge (mile 47 to 53, Appendix VI-4). The disturbance in these areas during fawning and calving periods (May 15 to July 15) could contribute to the loss of deer fawns and elk calves. There are insufficient data to quantify numbers of animals that would be lost through disturbance of the fawning and calving areas. This impact would occur only if construction took place during the period from May 15 to July 15.

Forty miles of access roads would be constructed between the town of Wattis and Soldier Creek (mile 15 to 55, Appendix VI-3). Of the 40 miles, 20 would be closed and 20 would be left open. The exact location of the road that would remain open is not known, but it could be located in deer and elk winter range, or in deer-fawning or elk-calving areas. The road remaining open would provide access to present roadless areas. Habitat could be lost in areas used for leisure time activities of the human population by driving animals from favorable habitat. There are insufficient data to evaluate the impacts on wildlife habitat or species by opening these areas for access. The road, however, would exist for the life of the project.

6. Waterfowl, Shorebirds and Raptors

As a result of the Emery project the Desert Lake Waterfowl Management Area would experience a 12 percent increase in the number of hunter trips (107) to this area. For the year 1975 to 1976 the area

experienced a 20 percent increase in hunter trips (180) for a total of 898 trips. Because of the small size of this marshland (2,261 acres) the 1975 to 1976 increase in hunter trips is more than the area can handle. Consequently, during the 1975 to 1976 season the quality of the hunting experience began to decrease. The Utah Division of Wildlife Resources has been considering alternative management practices to regulate hunting in the area. The increase in population due to the Emery project would further degrade the hunting experience. This impact would occur throughout the lifetime of the project and would be of concern to Carbon and Emery County residents.

Construction of the proposed transmission line in the areas of Provo Bay, Powell Slough, and the Utah Lake shoreline would cause a short-term disturbance to waterfowl, shorebirds, and raptors. If construction took place during the nesting period, the disturbance could cause some loss of production. The extent of this loss cannot be predicted, but it would occur only during construction of the transmission line. Such losses would not have a long-term effect on bird population levels.

The proposed transmission line in the wetland areas west of Provo would be a permanent hazard to birds flying there, and some birds would be killed by colliding with the towers or conductors. The number of birds that would be killed cannot be determined. However, such losses would not have a significant long-term impact on local bird life. The impact would continue for the life of the transmission line.

I. CULTURAL AND PALEONTOLOGICAL RESOURCES

1. General

a. Prehistoric and Historic Culture

In 1981, the number of persons associated with the proposal would constitute about 12 percent of the total population of Carbon and Emery counties. This population would contribute its share of impacts to the resource within the primary influence zone (2-hour driving distance from Price [Figure 2-19]). Increased cultural site visitation would subject all values to partial destruction or total loss. The losses would include previously undisturbed, pristine, prehistoric and historic cultural values.

Impacts would result from recreational activities of two types: those intentional, illegal activities associated with artifact collection and treasure hunting; and recreational (i.e., hiking, backpacking, hunting, or ORV use) which intentionally or unintentionally result in site damage or site erosion. Cumulatively, these activities pose the threat of destroying a nonrenewable, irreplaceable scientific resource. Such impacts result in the permanent loss of scientific information which would afford the archaeologist great opportunities for studying and interpreting complex environmental adaptabilities, site distributions, affiliations, and interrelationships.

The layman sees the cultural values in all areas of the proposed

project as small, unimpressive, limited-activity sites. Consequently, he treats them casually and with little care. About 90 percent of the sites in the study region and project area would be classed as limited-activity sites. Current anthropological theory and practice show that sites of this nature, representing maybe 14,000 years of cultural deposition, are scientifically important to understanding the total cultural phenomena.

Total population-oriented impacts on specific sites and areas are unknown and unpredictable as to number of sites that might be affected, as well as the extent of damage that might occur. Ultimately, damage could occur to both the local and regional prehistoric and historic values (i.e., Rochester Petroglyphs, and Euro-American values associated with exploration, trade, mining, railroad development, and colonization of the area).

b. Paleontological Resources

Population-oriented impacts on paleontological resources would be the same as for cultural, but the emphasis would differ. Impacts to vertebrate fossil sites, for example, would be greater than on invertebrate sites, since such remains are generally localized and less common. Locations of such scientifically important deposits are currently unknown.

Cumulatively, impacts threaten the retrieval process for vertebrate and invertebrate fossil remains and the acquisition of data which would aid in determining species evolution, migration, range, and the general interpretive story. The magnitude and extent of impacts that would occur are unknown.

2. Specific

a. Prehistoric and Historic Culture

Prehistoric and historic cultural site surveys have been made for the generating site and all three transmission lines. No evidence can be found at the generating site. Table 3-9 shows the maximum number of sites that could be impacted along each transmission line. For location of high impact areas along the transmission corridors see Appendices VI-3, VI-4, and VI-5. Impacts on historic Euro-American values would be low. Impacts to subsurface values are unknown. Their frequency will be limited; therefore, little impact is expected.

Cultural sites, both prehistoric and historic, have been vandalized and damaged as construction has progressed through similar areas containing these values. How much damage that would occur through the complete construction phase of the proposal is unknown.

TABLE 3-9

Potential Direct Impacts to Cultural Resources on Federal Lands

Transmission Lines	Number of Sites
Emery-Spanish Fork Canyon-Camp Williams	17 (2)[a]
Emery Salina Canyon-Sigurd	56 (3)
Sigurd-Camp Williams	115 (2)

[a]( ) indicates number of sites potentially eligibles for nomination to the National Register of Historic Places.

impact in the form of knowledge would be realized. However, removal of any data today would limit what might have been gained by preservation until future advancements in technology could yield a higher percentage of recoverable information. Losses would also occur to the aesthetic-recreational and interpretative-educational quality of the resource.

In all areas of the proposal no direct impacts would involve properties nominated to, or which have already been listed on, the National Register of Historic Places. However, seven sites have been identified as potentially eligible for nomination to the National Register of Historic Places. Stringent mitigating measures to protect these sites will be imposed should the project be approved. The Utah State Historic Preservation Officer has been contacted for his comments.

Pursuant to the Council on Environmental Quality Guidelines for Preparation of Environmental Statements, it is not necessary to contact the Advisory Council on Historic Preservation since no sites potentially eligible for nomination to the National Register of Historic Places would be adversely impacted.

b. Paleontological Resources

The possibility of finding important paleontological values in areas of the proposed project is remote. Direct project-related impacts are not anticipated. Intensive surveys have not been completed.

J. SCENIC RESOURCES

1. Visibility

The probable low volume of particulates and concentrations of NO_2 from stack emissions into the atmosphere of the region would not

reduce the visibility and aesthetic experiences of the viewing public based on observations at the Huntington power plant (Wagner, 1976). Soil particles from disturbed surfaces in construction areas would become airborne during wind storms causing a short-term impact, but would not permanently reduce visibility and public aesthetic experience.

2. Contrast

Visually, the generating complex would be a prominent industrial intrusion into a rural landscape. The structure would create a massive form, out of scale with the existing low profile landscape. The strong vertical line of the 600-foot stacks would constitute a significant contrast with the existing landscape character. The site would be located approximately 0.75 mile from Highway U-10 and would be visible to approximately 1,680 persons (600 vehicles) per day. Figure 3-8 illustrates the complex as it would appear from the highway. The complex would be visible for about 6 minutes to persons traveling at normal speeds along U-10 (Figure 3-9).

The panoramic character of the landscape would permit a relatively long-term viewing of the complex, resulting in a high visual impact.

The red strobe lights on the stacks would attract attention to the complex. The complex would also add variety to the landscape character and would change the aesthetic experience of the public. The accumulative visual contrast created by the generating complex would be high.

Surface disturbance and removal of vegetation for construction of the coal source, coal transportation, and water system would change the landscape character. The result, however, would create a low visual impact.

The contrast that would result from transmission line development

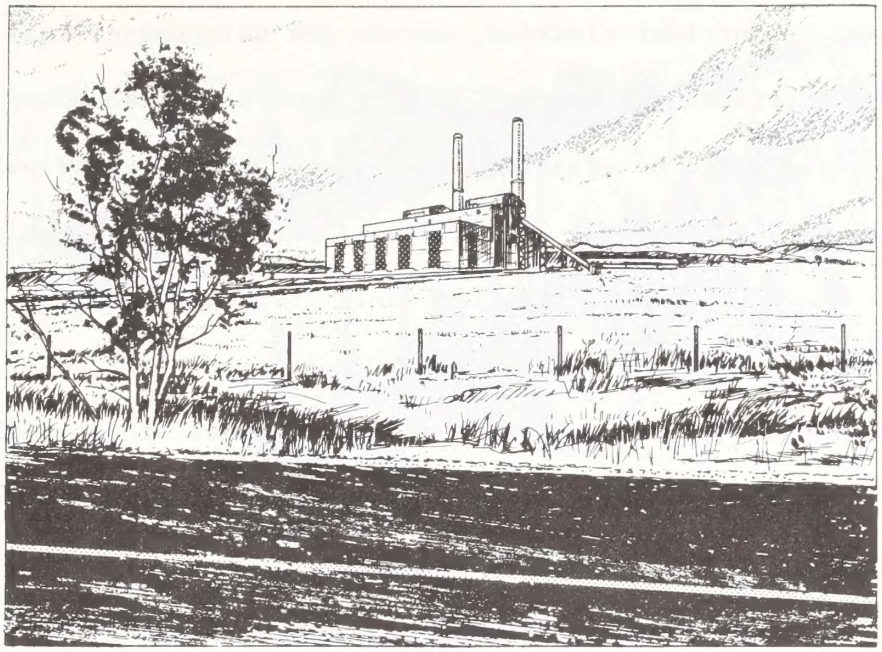


FIGURE 3-8

EMERY GENERATING COMPLEX AS SEEN FROM HIGHWAY U-10

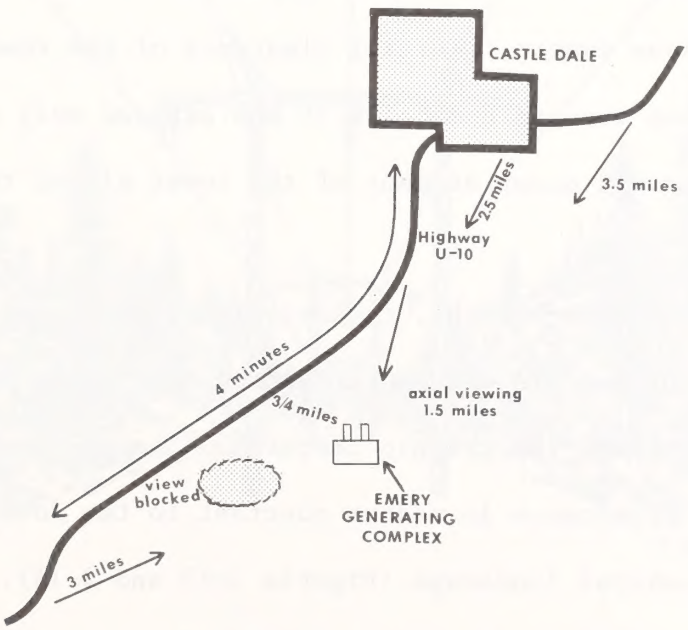


FIGURE 3-9

DISTANCE AND TIME GENERATING COMPLEX AS VIEWED FROM HIGHWAY U-10

would be caused by corridor clearing, access and maintenance road construction, tower site construction, and the building of towers and conductors. The transmission lines would be visible daily to approximately 952 persons (340 vehicles) on U.S. Highway 6 and 50, and 4,543 persons (1,165 vehicles) on I-70. In the Provo City area, the line would cross Interstate I-15 three times and would be seen by 65,025 persons (21,675 vehicles) daily on I-15 and by 28,500 persons (9,500 vehicles) daily on Center Street. These figures were derived from average daily traffic during 1975. Approximately 130 miles of transmission lines would be visible from major travel routes.

The removal of potentially hazardous high-growing vegetation from the transmission lines would produce a sharp linear contrast with the natural landscape pattern (Figures 3-10 and 3-11). These specific points of visual contrast are plotted in Figure 3-12.

Access roads, tower site surface disturbances, and removal of vegetation could constitute more visually prominent intrusions than would the transmission line towers. Initial clearance of the road would delineate sharp demarcation in texture and color of the exposed soil and surrounding vegetation. This could occur at many of the tower sites, resulting in a low contrast.

Because of their height, transmission line towers would constitute a visually prominent feature when superimposed over low-growing vegetation, or when skylined on high topographic features. The towers would project a rigid unnatural appearance in medium contrast to the form and lines expressed in the natural landscape (Figures 3-13 and 3-14). The specific points of visual impact are shown in Figure 3-12.

The power lines would create visual impact at highway crossings as shown on Figure 3-15. The specific points of critical contrast for

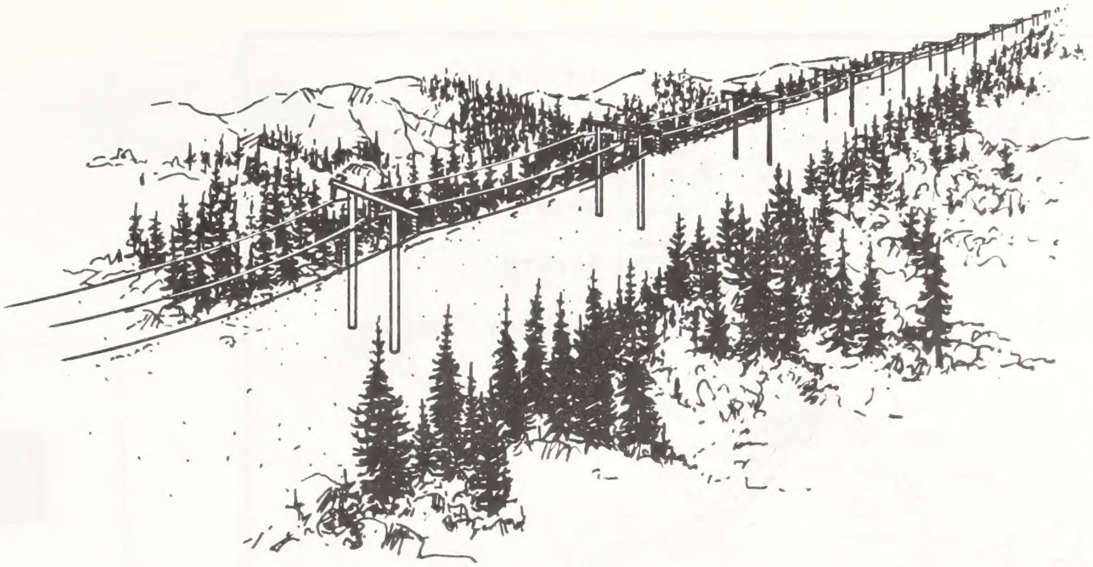


FIGURE 3-10

LINEAR CONTRAST OF VEGETATIVE CLEARING

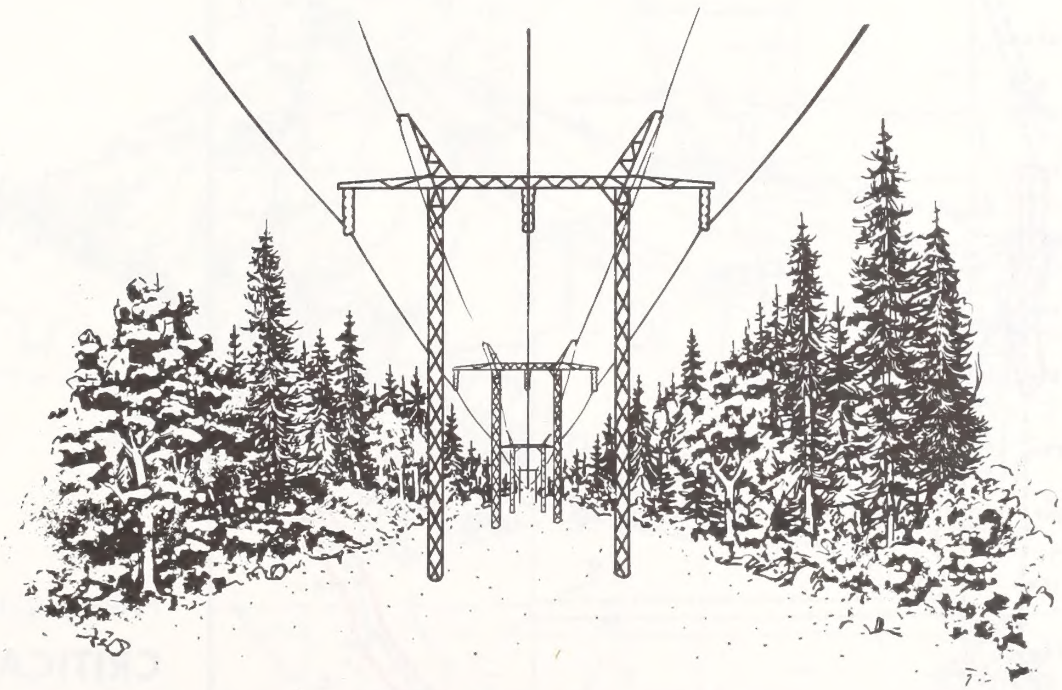


FIGURE 3-11

CONTRAST CREATED BY VEGETATIVE CLEARING TRANSMISSION TOWER SITE

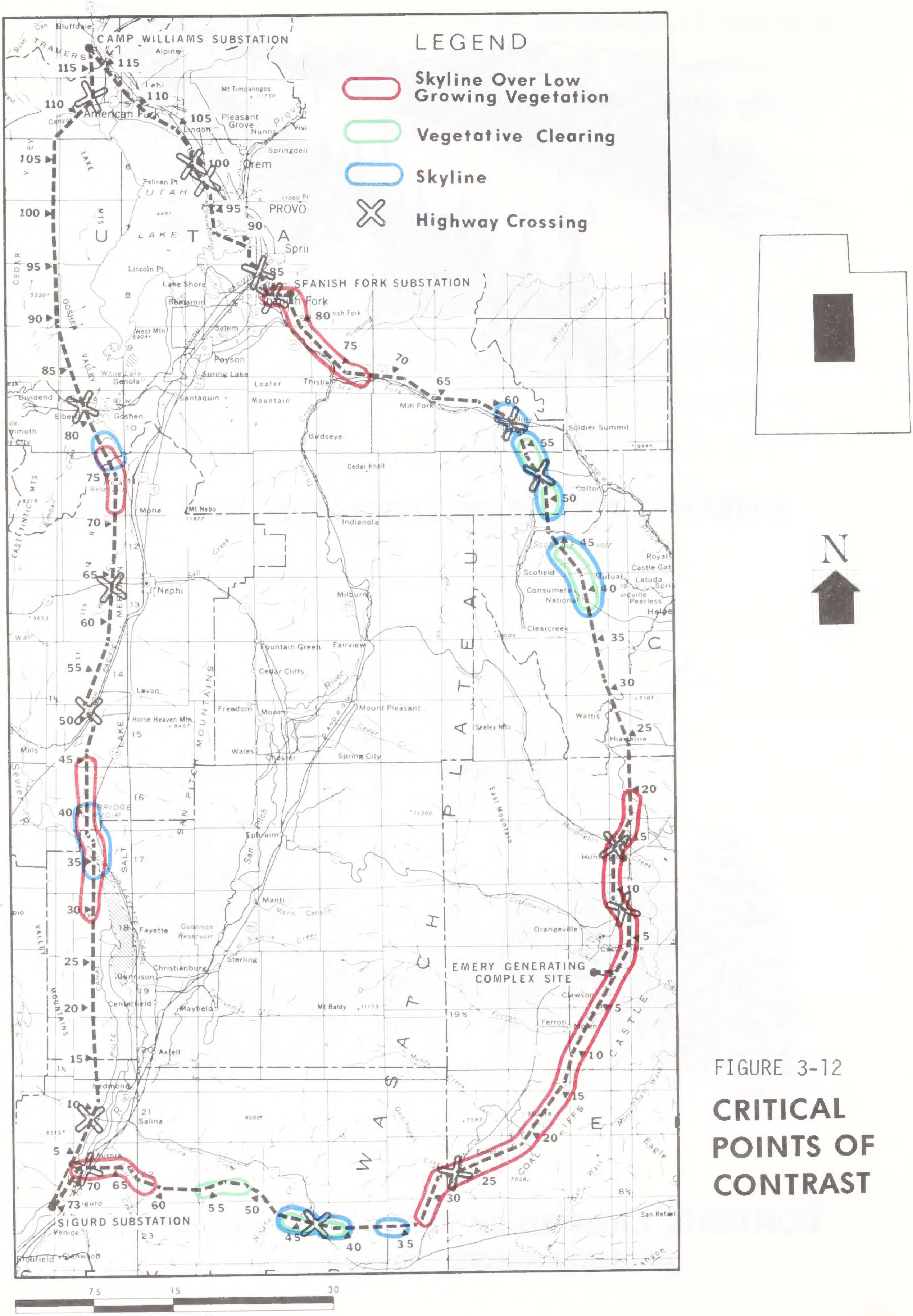


FIGURE 3-12

CRITICAL POINTS OF CONTRAST

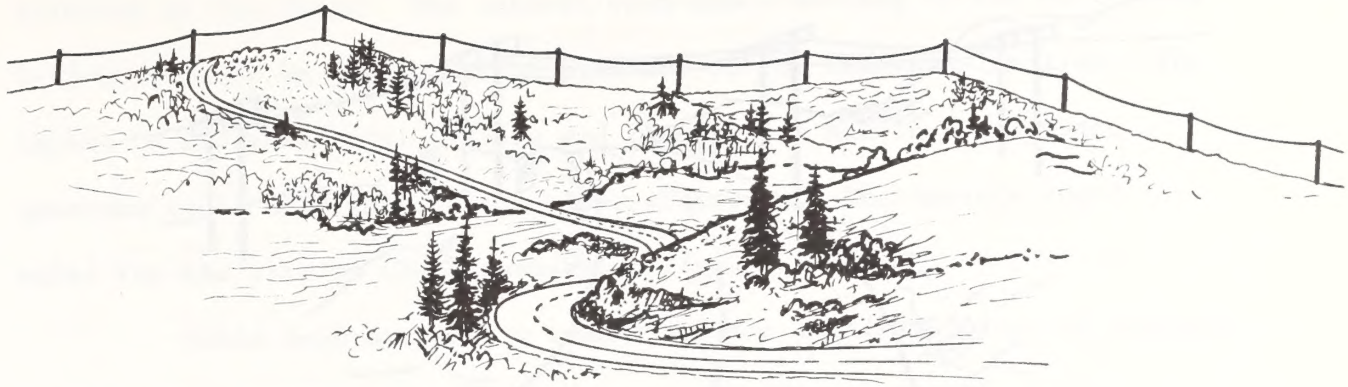


FIGURE 3-13

CONTRAST CREATED BY SKYLINE STRUCTURES

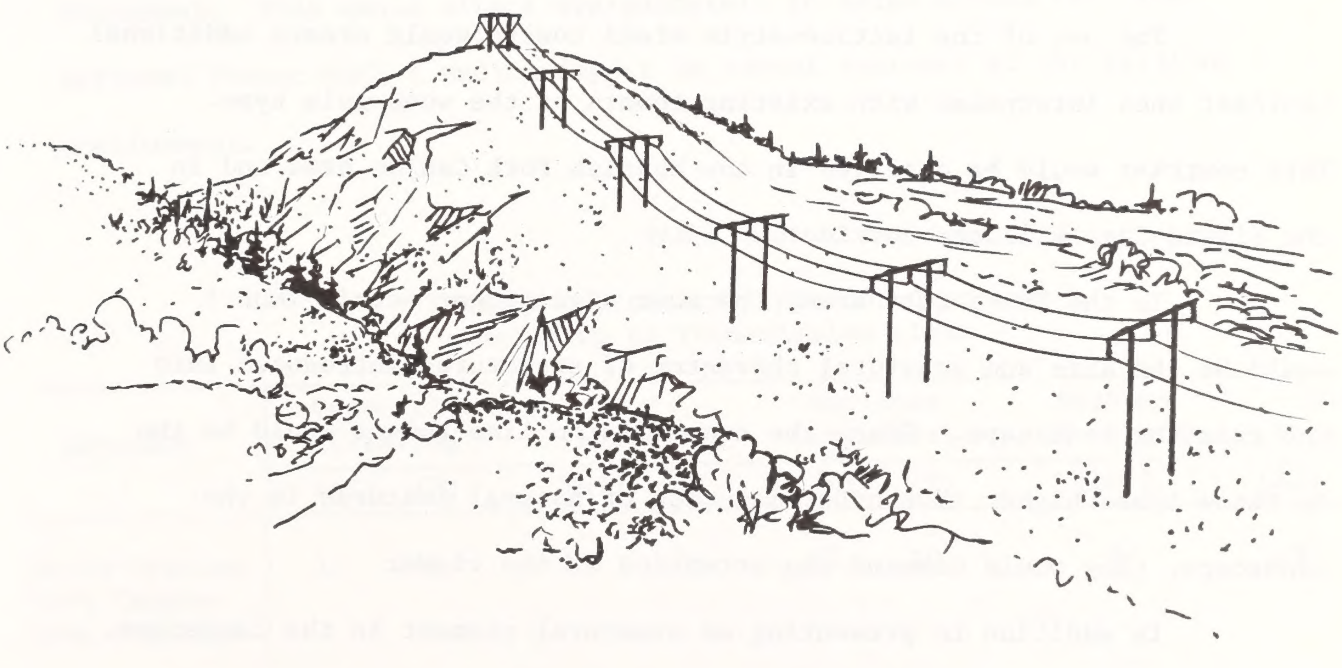


FIGURE 3-14

CONTRAST CREATED FROM STRUCTURES SUPERIMPOSED OVER LOW-GROWING VEGETATION

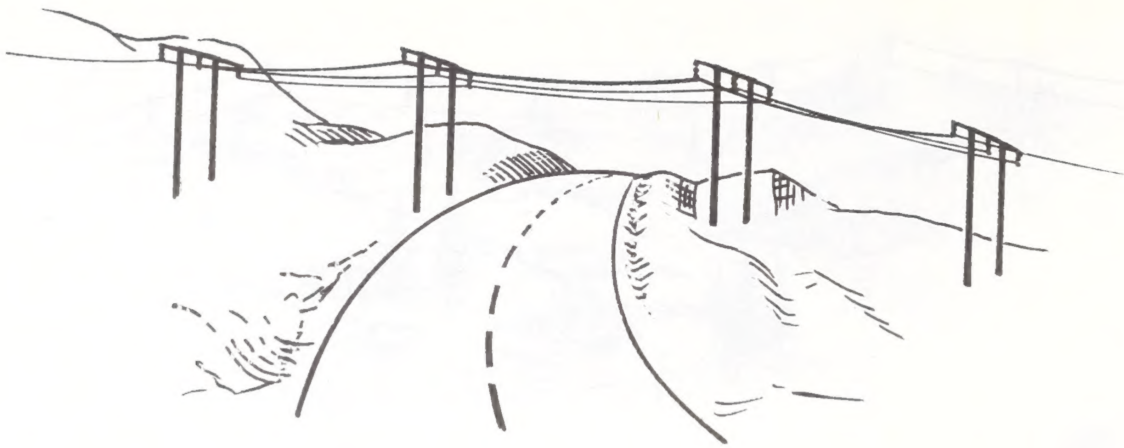


FIGURE 3-15

CONTRAST OF POWER LINES CROSSING HIGHWAY

the highway crossings are shown in Figure 3-12.

The use of the lattice-style steel towers would create additional contrast when interposed with existing towers of the wood-pole type. This contrast would be observed in the Spanish Fork Canyon area and in the Sigurd-Camp Williams corridor.

In the Provo City area, the most significant scenic impact would be the size and unnatural character of structures introduced into the existing landscape. Since the transmission line towers would be two to three times higher than other man-made or natural features in the landscape, they would command the attention of the viewer.

In addition to presenting an unnatural element in the landscape, the transmission lines would intercept the view of the mountains east of Provo. The majority of those persons (2,534-USDC 1970 Census) living west of I-15 would have one-half to all of the mountain front view

affected by the lines. The natural open-space setting to the west along I-15 would also be marred by the presence of the transmission line. The impact to the more rural setting and the present scenic, open-space panorama would be significant to some observers. The impacts would exist for the life of the transmission line.

Table 3-10 presents a summary of the critical points of contrast relating to the proposed transmission lines. The magnitude of the visual impact created by types of contrast along each corridor is shown in Appendix VI-6.

Construction of the Emery-Spanish Fork Canyon-Camp Williams line from Gilluly (milepost 57) to the mouth of Spanish Fork Canyon (milepost 82) would violate the U.S. Forest Service "retention" classification as the line and related construction "scars" would be visibly prominent. This would affect approximately 10 miles across the Uinta National Forest with a medium impact in visual contrast to the existing environment.

TABLE 3-10

Summary of Critical Types of Contrast
Relating to Transmission Lines

Corridor	Vegetative Clearing		Low Vegetation		Skylined Structure		Highway Crossing	Mixed Pole Type	
	(mi)	(%)	(mi)	(%)	(mi)	(%)	(no.)	(mi)	(%)
Emery-Spanish Fork Canyon-Camp Williams	12	10	19	16	12	10	8	25	21
Emery-Salina Canyon-Sigurd	9	12	42	57	8	11	3	--	--
Sigurd-Camp Williams	--	--	20	17	8	7	5	118	100

K. MINERALS

Peabody Coal Company proposes 50 percent mining recovery of coal over the period of 35 years.

Eighty-four million tons of coal would be mined for the generating complex with an estimated 84,000,000 tons remaining in the mine lost to ultimate recovery. This loss of 168,000,000 tons of nonrenewable coal reserves would be unavoidable. The amount represents about 13 percent of the total known coal reserves in the East Mountain area, and less than 3 percent of the known coal reserves in the Wasatch Plateau coal field (Doelling, 1975).

Deposits of sand, gravel, uranium, oil, and gas in the area would not be impacted by construction or operation of the proposed project.

L. LAND USE

1. General

Irrigation water amounting to 7,000 acre-feet has been acquired from local farmers to supply the needs of the generating complex. The water would be transferred from agricultural to industrial uses with the retirement of approximately 1,785 acres of agricultural land in the Ferron-Castle Dale area. The retirement of the agricultural lands would result in a total estimated loss of 481,050 pounds of live beef. (See Appendix IX for rationale for determination of loss of pounds of beef.)

Conversion of about 340 to 500 acre-feet of irrigation water to Emery County communities (limited to culinary water supplies) would retire 87 to 129 acres of crop land. The transfer would represent

further loss in the annual beef consumption (enough to feed approximately 300 persons).

The influx of people into the area as a result of the project would affect urban and non-urban recreational sites. Overcrowding of recreational facilities could cause deterioration of physical improvements and environments (vegetation, soils, water quality) and thereby change the quality of recreational experiences. Existing recreational facilities operated by federal, state, and local governmental agencies would be most affected as attempts are made to accomodate increased recreational needs within existing budgets and manpower limits. Officials from federal, state, and local agencies indicate that existing agency budgets are currently inadequate to provide the construction and maintenance of new recreational facilities.

Many of the recreational sites located in the primary influence zone are currently being utilized beyond capacity (Figure 2-29 and Table 2-12, Chapter 2). An additional 8,900 visitor-days for recreational use on federally-managed sites would be anticipated as a result of the increased population associated with the proposed project (Torgerson, 1976). This would be 12 percent of the total use expected. An additional 20 to 30 picnic and camp units (one unit provides facilities for five persons) would be required in the primary influence zone (based on usage experience at presently developed facilities).

No recreation sites are directly affected by the generating complex or any facility.

Recreational facilities in towns and cities in the influence zone would be heavily impacted. Price City and Helper are estimated to

receive 2,540 people or 50 percent of the population increase as a direct or indirect result of the project. The Price-Helper area would lack 3 to 4 acres of city parkland as a result of the population increase if they maintain the recommended ratio of parkland to population (USDI, BOR, 1967).

Increased usage and overcrowding of facilities within and around town areas would cause changes in the public recreational experiences, which could eliminate some historical uses of sites, campgrounds, and parks. Overcrowding could also result in limitations on public use of facilities, and in increased maintenance and operational costs.

An additional 16,000 visitor days (12 percent over present) spent fishing as a result of increased project-related population would result in an increased demand of 37,000 fish annually by 1981. This may necessitate increased stocking of trout in order to maintain the present catch rate. Increased stocking of trout would increase operating costs of the fisheries program of the Utah Division of Wildlife Resources. Also, an additional 4,500 visitor days of big game hunting would be expected to increase the harvest demand of mule deer approximately 7 percent (370 deer) annually in the Carbon-Emery county area. Most deer herds in Utah are already hunted to capacity. Therefore, 370 additional deer might not be available. In this case, the additional 4,500 man-days of hunting would be accommodated at the expense of lowered hunter success and more competitive hunting conditions. These figures represent about 12 percent of the total annual use expected by 1981 in the primary influence zone.

The ORV use by people associated with the proposed project

would be approximately 2,800 visitor days in 1976, and the number is expected to increase to 11,000 visitor days annually by 1981. This would contribute about 12 percent of the expected ORV impact on soils, vegetation, wildlife, and scenic resources within the primary influence zone.

2. Specific

The impacts indicated below would be site-specific and would be a direct result of proposed project facilities. Unless otherwise noted, impacts would be of local significance for the duration of the project.

a. Agriculture and Livestock Grazing

The 2,000 acres of land at the plant site would be changed from agricultural to industrial use, resulting in the loss of production from 800 acres of crop land and 1,200 acres of native forage. Conversion to beef production would represent a loss equivalent to the annual consumption of beef for about 1,340 persons (Schlappi, 1976).

In addition approximately 800 acres of adjacent land owned by UP&L was retired from crop production to lower the water table and reduce subirrigation of the plant site. An impact would result by the permanent loss of beef production equivalent to the annual consumption of beef for about 1,330 persons.

Parts of 11 farms were purchased by UP&L for the generating plant and associated facilities. No farms were actually retired since most purchases were for small segments of existing farms, and the farmers were able to purchase new lands to replace lands that were sold.

Construction of the proposed coal haul road would occupy 30 acres of alfalfa crop land within the right-of-way. The loss of 90 tons of alfalfa hay on this land represents an equivalent loss of beef that could be consumed by approximately 60 persons annually.

Surface subsidence above the Wilberg Mine could cause fracturing of underground, water-bearing geologic formations. The fracturing could dry up springs located above the mine which provide water for 486 cattle permitted by the U.S. Forest Service, 192 cattle on the U.S. Forest Service private land permit, and about 40 head grazed on fenced private property. These cattle presently graze the areas from June through September, but the area cannot be grazed without water. Thus, 2,872 animal unit months (AUM) of forage would be lost, representing a loss of beef production equivalent to an annual consumption for approximately 550 persons. This would be a permanent impact since the springs could never be restored.

In summary, the potential loss of crop and grazing land from all causes associated with the project would reduce beef production equivalent to an annual consumption for 3,280 persons. Loss of agricultural production would result in the annual loss of beef production of 2,720 persons and loss of native forage, the loss for 560 persons.

b. Recreation

The loss of pheasant habitat could eliminate 430 visitor days spent hunting at the generating complex site. An undetermined number of visitor days spent hunting as a result of construction of the Emery-Spanish Fork Canyon-Camp Williams and Emery-Salina Canyon-Sigurd transmission lines would be lost.

Stabilization of Millsite Reservoir could improve the quality of the fishing experience. Muddy shorelines would dry out and become more accessible. A more stable water level would exist in the reservoir.

Subsidence above the Wilberg Mine could cause slumping and surface tension fractures. There would also be a potential hazard to people and animals from falls into surface fractures. Some recreational uses are being made in this area during the summer and fall, including camping, hiking, use of ORV, and hunting. A few camper-trailers park in the area. The total amount of use is unknown. Future use would be expected to increase as the local population increases.

Construction of the proposed transmission line in the Provo Bay area could block public access to part of the Utah Division of Wildlife Resources road along the freeway (I-15) right-of-way. Blockage by the towers would prevent use of parking and turn-around areas on 1,250 feet of the road and would eliminate a boat launching site at the head of Provo Bay (Mill Race Creek). Use figures are not available for this road, but the construction would result in a reduction of recreational opportunities for an undetermined number of hunters, fishermen, and nature watchers.

c. Land Use Plans

All federal land use plans, except for the Muddy Planning Unit, provide for major transmission lines or utility corridors. None of the current county plans or zoning ordinances restrict transmission lines. However, the revised zoning ordinance under consideration by Utah County would restrict 345-kV lines to areas zoned I-1 or I-2, Industrial. If this zoning ordinance is adopted, most of the proposed

transmission corridor in Utah County would not be allowed except by special variance (Figure 2-31).

Plans for the Muddy Planning Unit were developed in 1972, and the need for a utility corridor was not identified. Designation of a utility corridor in the unit is not contrary to overall planning goals or objectives.

Provo City officials have considered the potential impacts of the proposed Emery-Spanish Fork-Camp Williams transmission line as it passes the Provo City area. This is of concern since Utah County (in which Provo is located) officials have projected a population growth from the presently estimated 160,000 to 200,000 by 1980, and new residential areas may be needed along the proposed route.

Construction of the proposed Provo City segment of the Emery-Spanish Fork Canyon-Camp Williams transmission line would eliminate 20 single-family residences. Based on an average house and lot value of $50,000, the loss in residential property would be $1,000,000. The line would also affect future residential opportunities by precluding development on the 120-foot right-of-way. Evaluated in terms of 80-foot frontage lots, the line would reduce or eliminate opportunities for 75 additional homes. The value of opportunities foregone, based on an average property value of $50,000 per home, would total $3,750,000. Thus, present and future residential values lost due to the line would total $4,750,000.

M. HUMAN RESOURCES

1. Demographic Trends

The rapid energy development in Castle Valley has resulted in a marked population increase in the past 5 years. At the present time

the Emery project has brought about an increase of approximately 1,165 persons to the Carbon-Emery county area. This number includes construction workers and service employees and their families, and represents about 25 percent of the estimated total population impact resulting from the Emery generating complex. Figure 3-16 shows the projected population growth with and without the Emery project.

It is estimated that 80 to 90 percent of the new population have settled in existing communities in Castle Valley. About 50 percent of the construction workers live in Price or Helper. About 30 to 40 percent live in Huntington, Castle Dale, Ferron, and Orangeville. The other 10 to 20 percent appear to have settled in rural parts of both counties. It is expected that future settlement patterns would remain the same.

The population resulting from the Emery project is expected to peak in 1979 with a total of 5,705 persons entering the area. Of this number, 700 would be construction workers. A full operational and mining force would be on hand at the end of 1979. The high population level is expected to be of short duration, less than 3 months, since construction work is expected to drop dramatically in the fall of 1979.

The population figures for the Emery project were not considered in relation to the Huntington project. The construction company anticipates phasing as many construction employees as possible from Huntington to Emery. The exact number cannot be determined. However, the transferring of workers from one plant to the other would partially stabilize the growing construction population. The total new population added by construction workers, operational personnel, service employees, and

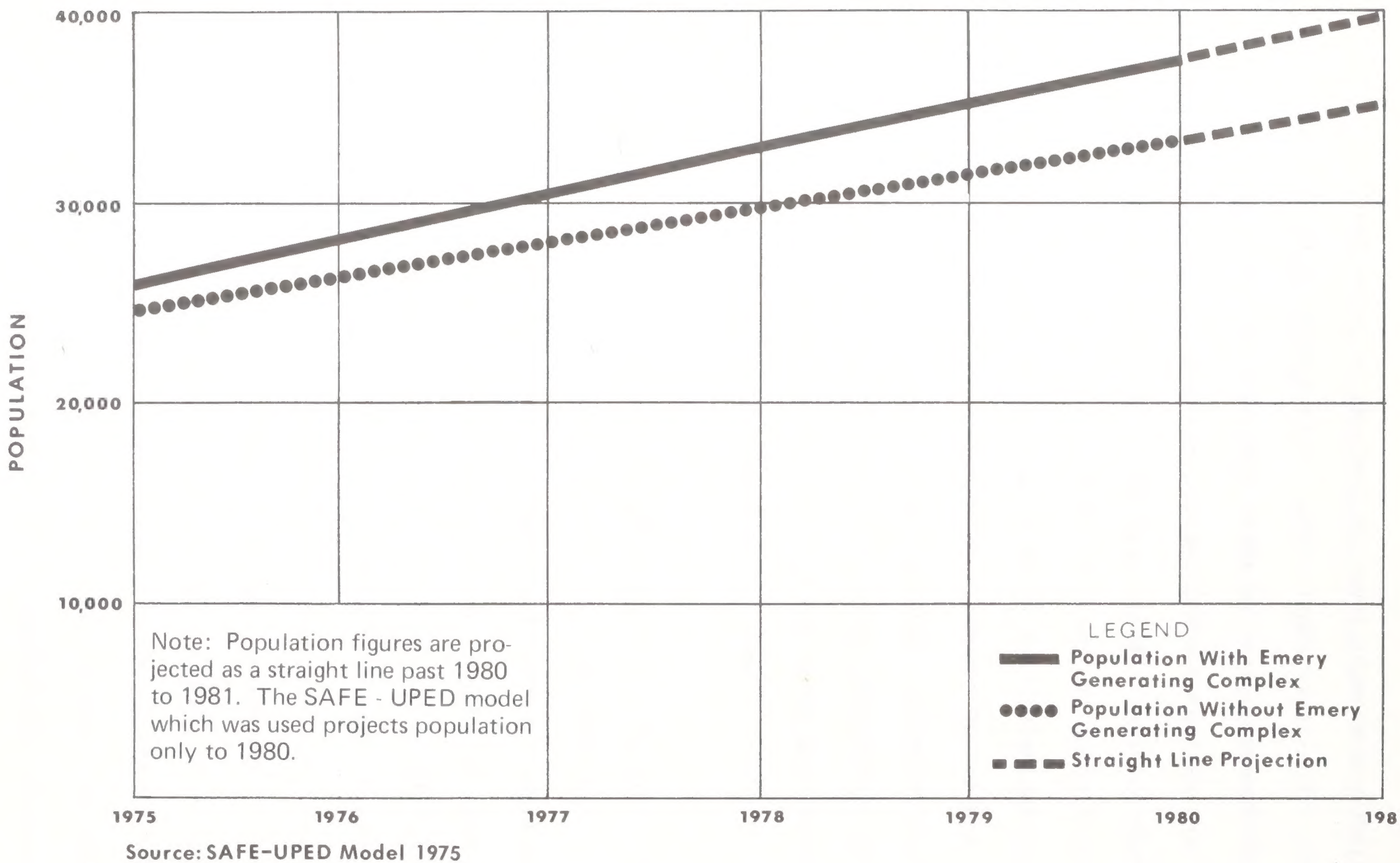


FIGURE 3-16

PROJECTED POPULATION - CARBON AND EMERY COUNTIES WITH AND WITHOUT EMERY GENERATING COMPLEX

families is expected to decline to 4,831 by 1980 (Table 3-11). As the number of service jobs increase, the total population should reach 5,085 by 1981 and level off at this number.

Utah County is one of the fastest growing areas in the State, and much of the growth is expected in the area of Provo City, west of I-15. The transmission line corridor in that area would eliminate the opportunity for construction of 75 new homes. This would mean that about 263 persons (3.5 per household) would have to settle elsewhere.

2. Employment and Income

The employees hired for construction of the generating complex were largely supplied from outside the Carbon-Emery county area, however, many have been in the area for some time working at the Huntington plant. Figure 3-17 indicates total employment growth in the area, as well as the projected employment through 1981 for the UP&L Huntington and Emery projects.

The Huntington project should reach maximum construction employment in the summer of 1976 with approximately 850 workers. Emery employees at the highest quarter of 1980, would number 345 construction workers, 600 miners, 203 plant operators, and 46 truck drivers (Table 3-11). It is anticipated that some of the construction workers would continue to be phased over to the Emery power plant as the work is completed at the Huntington plant. The total employment trend of Castle Valley is upward, and these workers may take other local jobs rather than leave the area. Therefore, the Emery project would contribute to the total upward trend of employment. Employment caused by the Emery plant would peak in 1977 and 1979 at approximately 1,400 workers. This would represent

TABLE 3-11

Forecast of Employment and Population Resulting From
Construction and Operation of Emery Generating Units 1 and 2

Employment or Population	Highest Quarter						
	1975	1976	1977	1978	1979	1980	1981
Construction Employment	160	575	1,042	555	700	345	0
Population[a]	480	1,725	2,606	1,665	2,100	500	0
Operation & Maintenance			101	130	187	203	203
Population[b]			303	390	562	609	609
Mining Employment	50	170	260	260	500	600	600
Population	150	510	780	780	1,500	1,800	1,800
Coal Truck Drivers & Maintenance			25	25	46	46	46
Population			65	65	130	130	130
Service Employment[c]		80	275	305	471	597	849
Population		240	725	915	1,413	1,792	2,197
Total New Population	630	2,475	4,479	3,815	5,705	4,831	5,085

Source: UP&L and Peabody Coal companies (modified by computations using USDI, BLM 1975 SEDS figures); and the SAFE-UPED Utah Process Alternative Futures 1975-1990, Volumes I and II.

[a]Construction and service employees were calculated as 40 percent unmarried because of the high number of singles in transient construction work and the high number of service employees who are spouses.

[b]Operational employees and mining employees were calculated as 20 percent single, because of the permanence of the jobs and the higher incidence of marriage.

[c]Service related employment was calculated by using a multiplier of 5.0 during the first six years and 1.0 during the seventh year. Family size is assumed to approximate the state average of 3.5 persons.

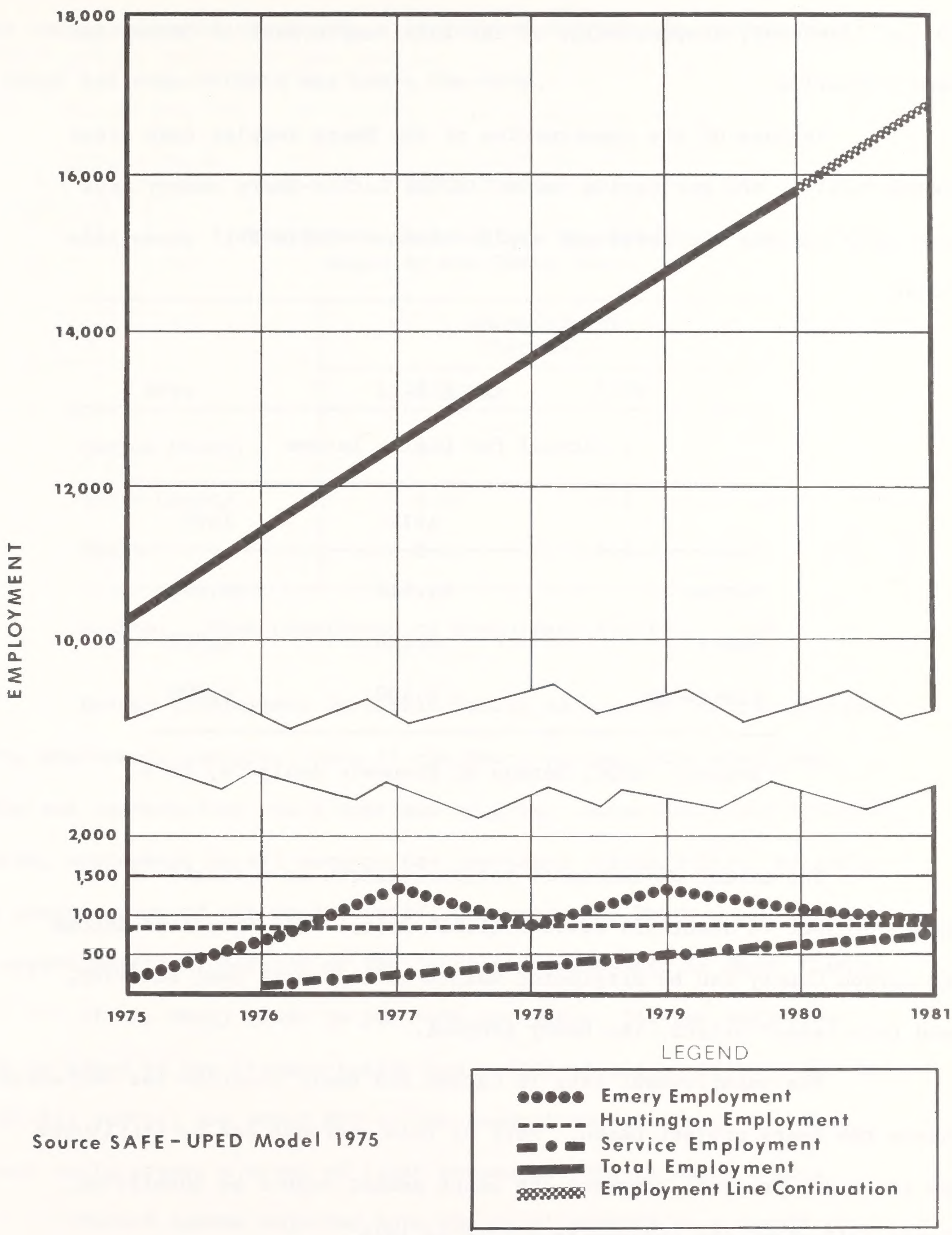


FIGURE 3-17

PROJECTED EMPLOYMENT IN CARBON AND EMERY COUNTIES

11 and 9 percent, respectively, of the total employment in Carbon and Emery counties.

Because of the construction of the Emery complex (and other developments), the per capita income in the Carbon-Emery county area currently exceeds the state per capita income. Table 3-12 shows this change.

TABLE 3-12

Annual Per Capita Income

	1974	1975
Carbon	$4,412	$5,400
Emery	4,136	4,900
Statewide	4,400	4,800

Source: USDC, Bureau of Economic Analysis, 1975.

The amount of increased personal income as a result of the Emery project is about $14 million (Table 3-15). The increased income in Carbon County can be attributed mainly to increased coal activity, and to a lesser extent, the Emery project.

The unemployment rate in Carbon and Emery counties has decreased since the Emery project began. Part of this decrease can be attributed to the Emery project; however, the exact amount cannot be quantified. Table 3-13 shows the changes from 1975 to 1976.

The increased per capita income and low unemployment rate should continue through the construction phase of the project. As the

Emery construction is completed, a short-term increase in unemployment may occur and some workers may leave the area.

TABLE 3-13

Unemployment Rates Since Construction Began at the Emery Site

Area	Unemployment (Percent)	
	1975	1976
Carbon County	8.2	6.2
Emery County	6.7	3.2
State	8.1	6.4

Source: Utah Department of Employment Security, 1976

Energy development in Castle Valley has caused drastic changes in the employment sectors. Even if the Emery project were abandoned, mining and construction would continue to grow. Since Emery construction started, employment in all sectors has increased (Table 3-14). By 1981, when construction of the project would be completed, Emery would account for approximately 12 percent of the increased employment in Emery County.

If the Emery plant is put into operation, 249 new employees would be added to the transportation and public utilities sector, 600 to the mining sector, and about 800 to the general services sector. The project would create a total of 1,649 permanent jobs in Emery County.

Future income injected into the local economy as a result of salaries paid by the Emery project is nearly $15.0 million (Table 3-15). Additionally, service employment accounts for $1 million in income and

TABLE 3-14

Increase in Employment Sectors

Sector	Employment					
	Carbon County			Emery County		
	1973	1974	% Change	1973	1974	% Change
Mining	1,043	1,095	5.0	644	842	30.8
Construction	151	274	32.5	713	460	35.5
Agriculture	212	212	0.0	392	392	0.0
Transportation	492	503	2.2	54	[a]---	----

Source: USDC, Bureau of Economic Analysis, 1976.

[a]Not shown to avoid disclosure of individual firm data.

TABLE 3-15

Projected Direct and Indirect Income
From Emery Power Generating Plant

Type of Employee	Average Income[a]	Income Multiplier	Number Employees 1976	1981	Total Income 1976	1981
Plant	$12,500	1.2	0	203	0	3,045,000
Mine	14,200	1.3	170	600	3,138,200	11,076,000
Coal Transportation	15,300	1.24	0	46	0	873,000
Construction	20,000	1.37	397	0	10,877,800	0
Total			567	849	14,016,000	14,994,000

Source: UP&L (modified by calculations using USDI, BLM SEDS 1974 figures)
U. of U., Utah Economic and Business Review, July and August 1967.

[a]Income is mean income for 1974 and amounts are in 1974 dollars.

is expected to increase to \$6.8 million by 1981. By 1981, the estimated total annual direct and indirect income from the project would be \$21.8 million. This income would benefit the Emery work force. However, persons with fixed incomes, and those engaged in nonenergy related employment in Carbon and Emery counties would experience reduced buying power.

Currently, the income produced from the Emery project represents about 12 percent of the total income in Carbon and Emery counties. It is unknown what percent of income the project would produce in the Carbon-Emery county area by 1981. Preliminary estimates indicate, however, that the figure would be between 10 and 20 percent of the total.

3. Tax Base

The assessed valuation of all property in Emery County would increase significantly upon completion of the Emery generating complex. When finished, the project itself would have an assessed valuation of at least \$53.6 million, as compared to the entire county's total assessed value of \$49.3 million in 1975. Property taxes paid by UP&L for the Emery project would be approximately \$2.9 million annually.

Another major source of revenue to the counties would be the royalties on the coal mined at Wilberg. Recent federal legislation requires a royalty of 12.5 percent of the value of all coal mined to be paid to the Federal Government. Approximately half of the 12.5 percent is then returned to the state. The county in which the coal was mined then receives 10 percent of the state total. Hence, at the current market rate of about \$20 per ton, the Federal Government would receive \$2.50 of which \$1.25 would go back to the state. The counties would then receive 12.5 cents per ton of coal. Using the coal consumption

estimates of 2,400,000 tons per year, the county's share of the royalty would amount to $300,000 annually. Over the life of the project, royalties to the counties from coal used at the Emery generating complex would total $10.5 million.

New equipment and mine improvements would raise the assessed value of the Wilberg Mine to about $2.4 million. Approximately $600,000 in property taxes would be paid in 1977, the first year of full operation. The amount would decline over a 10-year period to about $60,000, assuming no further capital expenditures.

Sales taxes produced from the Emery project could be as high as $670,000 per year.

Revenue from the Castle Valley Special Service District could be used for water and sewer improvements in the communities in the district. The main source of revenues would be from the large power plants in the county.

The approximate total per capita cost for all community improvements would be $1,635, and the bulk of this cost would be borne by city government. Table 3-16 details the estimated cost per each new individual in a community. Most of these costs occurred before or during the construction of the Huntington plant, however.

4. Housing

The impacts on housing and community cohesion have already begun. The added population resulting from the project and the concurrent demand for housing, goods, and services already amounts to approximately 25 percent of the expected demand for products and services. Presently, about 25 percent of the construction work force are in the area. Most

TABLE 3-16

Distribution of Local Capital Expenditure Needs

Service	Distribution			
	City	County	School	Total
Water	$ 625	$---	$---	$ 625
Sewage and Solid Waste	[a]500	---	---	500
Fire Service	88	---	---	88
Libraries	---	46	---	46
Recreation	20	110	---	130
Health Care	---	54	---	54
Police and Security	30	30	---	60
Schools	---	---	132	132
Total (exclusive of streets and roads)	$1,263	$240	$132	$1,635
Percent Total Capital Needed	77%	15%	8%	---

Source: Federation of Rocky Mountain States, Inc. 1975.

Note: Water and sewer costs are often shared about 40 percent by the city and 60 percent by the subdivision developer. The above figure contemplates full city installation in order to offset extra inflation in a rapid growth town. At 3.25 people per unit this amounts to a lower housing cost of about $2,200.

[a]Up to $120 per capita is available from EPA.

of these workers have found new homes. However, some are living in trailers in canyons and other outlying areas of the counties. Exact locations and numbers of these campers and the significance of impacts are unknown. The Emery project will affect the availability of homes for other people moving into the area.

The recent population increase has had a great influence on housing. Vacant and new housing is currently unavailable for any substantial influx of new population. New employees would face a severe housing shortage as well as a lack of mobile homes and motels.

Housing demands that would result from the new population are listed in Table 3-17. Construction worker demands for housing tend to be less for home ownership than for rentals. Generally, four owners to three rentals are assumed for calculation of the demand for permanent employees, and four rentals to three owners for temporary employees (THK, 1974 and DRI, 1974). Some mobile homes would be brought to the area by the construction workers. These homes, plus mobile homes purchased locally, would create a need for mobile home parks and utilities.

The greatest impact on housing would occur in 1977 when 880 owner and 905 rental units would be needed, and in 1979 when 970 owner and 904 rental units would be needed. In 1981, and in all years thereafter, the housing needs for Emery would be 859 owner and 644 rental units. About 50 percent of the construction workers and operators are expected to live in Price and Helper, and 30 to 40 percent to live in Huntington, Castle Dale, Ferron, and Orangeville. The remaining workers would be expected to find housing in the more rural areas of Castle Valley.

In the Provo City area, the proposed transmission line corridor would displace approximately 70 persons (20 homes) and preclude the

TABLE 3-17

Projected Housing Demands Resulting From Construction and Operation of Emery Generating Units 1 and 2

Type Employment	Number of Housing Units									
	1977		1978		1979		1980		1981	
	Own[a]	Rent[b]	Own	Rent	Own	Rent	Own	Rent	Own	Rent
Permanent Employees	414	311	423	309	670	504	737	554	859	644
Temporary Employees	466	594	184	246	300	400	85	115	0	0
Total Requirements	880	905	607	555	970	904	822	669	859	644

Source: VTN, 1975a, as adopted to revised UP&L estimates.

[a]Includes mobile homes.

[b]Based on three owner to four rental for construction employees and four owner to three rental for plant, mine, and service employees. (The number of mobile homes that would be brought in by workers is unknown.)

opportunity for development of 75 additional homes along the freeway route. The number, age, and market value of homes to be removed are given in Table 2-17. Relocation expenses, in addition to the value of homes and land, would total approximately $183,000 (Kirkham, 1976).

5. Community Services

a. Local Government

The top-level organization of local governments is not expected to change. However, impacts on total government may be far-reaching. Elected officials may be defeated for reelection by newcomers employed

by one of the energy-related companies. If newcomers arrive in sufficient numbers, they could dominate some local governments.

b. Carbon and Emery Zoning Ordinances

No changes would occur in the zoning ordinances of the two counties.

c. Water Supplies and Sewage Disposal Systems

A new work force population would create special utility problems. Presently, all communities in the proposed project area are either experiencing shortages in water supply or nearing capacity in the sewer systems.

Water supply requirements may be expected to range between 0.26 and 0.34 acre-foot per year, per person. A total additional supply of 1,173 to 1,534 acre-feet per year would be needed. The population increase would create an additional water purification demand for 1,050,000 gallons per day at peak periods, and 850,000 gallons during a normal day.

Price City can presently supply a total of 3,600,000 gallons per day to 10,000 users (360 gallons per day per person). A water plant should have the capacity to process a peak day, plus 15 percent. The present plant would need to process an additional 510,000 gallons per day for the increased population. New water purification facilities would be necessary at Helper and Price to accomodate the increased population resulting from the Emery project (Templeton, Link, Alsop, 1974). The town of Huntington is currently rebuilding its water system to accomodate additional users. The Castle Dale and Orangeville systems

can accomodate additional water users, but the exact number of subscribers has not been determined.

Price City could serve perhaps 5,000 additional people with its present sewer design capacity, but additional sewer lines would be required. Castle Dale and Orangeville sewer systems, together, could possibly serve up to 3,000 additional people. The new Ferron system could accomodate 240 additional people. The town of Emery does not now have a sewer system. Increased population in communities that are at, or near, design capacity for sewage disposal could saturate the systems resulting in inadequate treatment of sewage. Requests by potential subscribers could be denied.

d. Education

One-hundred and nine Emery project-related, school-age children were enrolled in 1976; this number would increase to 396 by 1977. The 1978 enrollment (resulting from the new population) would increase to 1,221 pupils. By 1983, new school enrollment would probably drop to around 1,019 students (Table 3-18).

Approximately 53 additional classrooms and 55 new teachers would be needed to accomodate the anticipated 1,221 new students.

Approximately $1,240,000 would be needed for new facilities. The location of such facilities would depend upon where the new population settles. In a growing community, teacher salaries may have to be higher than the state average in order to attract teachers to the area with the probability of only temporary employment and inflated housing costs.

TABLE 3-18

Projection of Additional School-Age Population Resulting From Emery Power Generating Units 1 and 2

Age Group	Number Students							
	1976	1977	1978	1979	1980	1981	1982	1983
Elementary	55	198	611	515	538	483	489	499
Junior High	27	99	305	258	269	242	245	260
Senior High	27	99	305	258	269	242	245	260
Total	109	396	1,221	1,031	1,076	967	979	1,019

Source: VTN, 1975a.

e. Public Safety

New populations could create a need for nine new police officers - three in Price and at least one in each small community. This estimate is based on two police officers per 1,000 population. Other major capital expenditures would include cost of vehicles and equipment as well as expanded office space. The average salary of police officers is not competitive with construction and mine salaries; this would promote a higher police turnover rate. Positions could become highly difficult to fill with qualified personnel if rental and housing costs approach levels which the policeman cannot afford.

A full-time fire department in Price would be a necessity. Eventually, the department would require an initial investment of $70,000 for station additions and equipment, and about $300,000 for personnel (30 employees at $10,000 per year) (USDI, BLM Tri-County Socioeconomic Study, 1973). Initially, four or five men would be hired, and others

would be added in time. Volunteer departments serving other communities in Emery County would also need additional equipment.

f. Public Health

Hospital facilities are already inadequate for a two-county area with a population over 25,600. However, only 50 percent of the hospital beds are presently being used. As the population increases, there would be the need for at least 12 additional hospital beds. However, the exact number of needed beds cannot be assessed, since many Castle Valley residents travel to Salt Lake and Provo for optional surgery, (Edmonds, 1976).

The Carbon-Emery county area presently needs 17 additional doctors (Edmonds, 1976). The increased population from the Emery project would require two new doctors and 33 more hospital personnel, based on American Medical Association Recommundations.

6. Quality of Life

Experience in Wyoming has demonstrated that dissatisfaction with the availability of goods and services increases with rapid growth, and that an inadequate and unstable labor supply can thereby result. This situation would lead to declining industrial productivity. The viability of local government may be impaired, and the quality of goods and services lowered.

The changes in the availability of goods and services cannot be attributed to the Emery project alone. The general energy development in Carbon and Emery counties has also had its effects.

The availability of goods and services has increased in Carbon

County. Price has a newly proposed shopping center, a new chain grocery store, and a new chain drug store. Such new stores offer a new and a wider range of goods to the community with products at lower prices than the existing local stores. Stores of long standing in Price may be unable to compete, and their economic viability is questionable. The public's failure to shop at the old stores may be a reflection of the novelty of the new large stores, but more probably, changes in shopping patterns could be a reflection of the newer chain stores' lower prices and wider inventory. The new stores are characterized by crowded shopping conditions.

Residents of Emery County are enjoying an increased availability of goods since a new "mini-mall" was built in Ferron during the past year. Both counties should continue to see newer and larger stores as energy development continues.

Other services, however, have deteriorated in Carbon and Emery counties. Presently, it is difficult to obtain an appointment with a local doctor, and a patient may have to wait hours after an appointed time to receive needed medical treatment. Many people feel compelled to go to Provo and Salt Lake City to receive medical attention, and for elective hospital care.

Local residents also report that the quality of police protection has declined, and that traffic, traffic hazards, and noise are increasing. Local police also report increased criminal activity. A representative of the Carbon County Sheriff's Office has reported that the crime rate has doubled over the past 2 years, and that over 250 major criminal complaints were filed in May, 1976. The crime rate in Carbon County is

expected to increase.

The crime rate in Emery County is increasing each year. The crime rate for all types of crime increased 327 percent over the last 2 years; the county now has a 24-hour dispatcher and has reopened the county jail. The Emery Sheriff's department is also handling additional law enforcement duties for the communities in Emery County.

Since Price is the largest community in both Carbon and Emery counties, the impacts associated with rapid growth would not be as noticeable as in the smaller towns. Price began as a mining boom town, and is still a mining town. In the past, Price has experienced several coal booms and has conformed to the economic upsurges as well as to the downturns that followed. Price and Helper are also ethnically and religiously diverse. The population of the communities is made up of Greeks, Italians, Spanish-Americans, and many other groups. Prominent religions are Catholic, Protestant, and Mormon.

The communities in Emery County are primarily agricultural, and rather small. The Emery County population is very homogeneous comprised mainly of descendents of early Mormon settlers. Influx of new people would change the ethnic and religious structure.

The present population expansion has decreased the quality of life in the impact area. For example, building lots are nearly impossible to find, and local motels and restaurants are usually filled to capacity. The rapid growth associated with Emery would accelerate the demand for all kinds of community services beyond the available revenue sources. Inadequate services and intangibles could result in degradation in quality of life and a high turnover in employment.

A recent opinion study was conducted with the express purpose of assessing probable sociological and sociocultural impacts associated with the coal industry development in Carbon and Emery counties. The report stated:

> "It is clear that most residents of the area recognize that important trade-offs are likely to be involved. It is projected that many currently negative community characteristics will change for the better. At the same time, social costs will also be experienced and many of those factors which now make the communities in Carbon and Emery counties attractive to their residents will change for the worse. Weighted in the balance, however, the positive seems to prevail in the public mind." (Albrecht, 1975).

Rapid population growth increases fringe settlements wherein newcomers lack adequate opportunity to identify with, and become involved in, existing community life. Low levels of social cohesion result in increases in psychological alienation. Alcoholism, drug addiction, and mental health problems are likely results.

Such problems will be more likely to occur in an area that is culturally homogeneous such as Emery County. If many of the employees come from other areas, they may not be accepted by current residents, and they may not make an effort to become part of the functioning communities. If this occurs, the quality of life for both long-term residents and newcomers may be reduced substantially.

The transmission line corridor in the Provo City area would have a short-term impact on the quality of life in that area. Approximately 70 persons would have their lives disrupted by the necessity to relocate. About 65 percent of those that would be affected own their own homes, and 85 percent work within the Provo-Orem area. Therefore, it would be likely that most would relocate in the immediate area, and there would

be no major change in their lifestyle. Some residents would view the transmission line as a negative element in their neighborhood and may relocate to avoid it. Some potential home buyers may also avoid purchasing lots adjoining the corridor, but other buyers may actually seek such lots.

The presence of the transmission line in the area would have little or no detrimental effect on the value of adjoining lands. Most objections to power lines are raised in the initial phases when corridors are delineated and construction begins. After the power lines are in place, property values become similar to comparable property far from the transmission line right-of-way (Dew, 1976).

Television and radio reception near the right-of-way would generally not be affected by the transmission lines. Sparkovers caused by loose hardware or poor connections could cause static on amplitude modulation (AM) radios and lower frequency television channels (such as channels 2-6). The metal poles and lines may cause ghosting (multiple images) on some television sets, and background noise on a weak AM radio signal may be increased.

N. HUMAN HEALTH AND SAFETY

1. General

Industrial and automobile accidents seem to occur at random, and their frequency is difficult to predict. (See Table 2-25, Chapter 2, for accident rates.) If the project were implemented, highway traffic would maintain existing accident hazard levels, but as the number of construction workers, plant operators, and miners reach full force, the

potential highway accident rate would increase.

The coal haul road would create a new potential traffic hazard to private vehicles traveling the road. About 1.57 accidents with 0.283 fatalities per year or one death in 3 years would be expected from the coal haul operation. These figures are based on the average of 2.39 accidents and 0.43 fatalities per million miles traveled. The trucks would be expected to travel about 657,000 miles per year.

Noise levels would increase along the coal haul road. An estimated nine trucks per hour for 16 hours each day is the predicted traffic rate. Maximum noise level from tested diesel trucks at 50 feet from the road is reported to be 89.5 weighted decibels (dBa) (EPA, 1971). Few people would be affected by the noise, however, since there are only a few homes along the proposed route. Wildlife near the road may be disturbed by the traffic.

The nearest town to the coal haul road is Orangeville, situated 0.5 mile from the route. Residents of Orangeville could expect a noise level of about 60 dBa outside their homes, and a 50 dBa level inside a frame house with the windows open. These levels are not hazardous to health, but may be annoying to residents for the few days it is necessary to become accustomed to the new sounds (Utah Department of Transportation, 1976).

2. Mine Accidents

The accident death rate may be higher than the national average of 0.04 per million man-hours during the early years of operation of the Wilberg Mine. The higher rate would be due primarily to the relatively younger age and fewer years of experience of the workers who would work

the Wilberg Mine. The exact magnitude and duration of the increased accident rate cannot be predicted.

With proposed mining techniques, surface subsidence above the Wilberg Mine would probably occur. The subsidence may appear as large surface tension cracks which would present a significant hazard. If a person hiking in the area should accidentally slip into a crack, he could fall several hundred feet. Although the numbers are unknown, people are now making recreational use of the area, and the number of visitors would be expected to increase as the local population increases. The hazard would be expected to remain permanently.

3. Plant Construction Hazards

The hazards involved in plant construction are greatest during structural steel assembly. Falling from the superstructure would be the main cause of injuries. Injuries and fatalities may occur as plant construction proceeds. The number of accidents that might be expected during construction is unknown.

4. Transmission Lines

Residents of Utah County (the only heavily populated area through which the proposed transmission lines would pass) could suffer injuries from a falling line or tower. Although modern equipment would shut down the current flow, test the line, and shut it down again before the falling line can touch the ground, the weight of the conductors could damage property or injure people. The risk, though slight, would exist and would remain for the life of the transmission line.

The danger to children flying kites exists wherever transmission

lines are routed. However, children in the Provo area would be less likely to fly kites over both the transmission line and the freeway because of the certainty of losing the kite if it came down.

In the Powell Slough and Provo Bay areas, the conductors would be less than 50 feet over the heads of waterfowl hunters. The possibility exists that a hunter could shoot down one of the conductors thereby causing injury to himself or others and damage to property. This risk would remain for the life of the transmission line.

In Provo City where the line would parallel the freeway, a vehicle could collide into a tower, causing death or injury. It is unlikely that an automobile would shear off a tower at the base. However, a heavily-loaded truck could, and the fallen tower could block at least one lane of freeway traffic. This risk would exist for the life of the transmission line.

Ozone, electrical fields, and induced current produced by the transmission lines would be below the levels considered hazardous to human health and safety. Current information indicates that high voltage lines do not affect the performance of heart pacemakers (Hook, 1976). Hazards to persons working with long, metal objects in the area would exist for the life of the lines. Such objects as metal sprinkler pipes, cranes, etc., could contact the conductors resulting in electrocution of persons using such objects.

O. MARKET AREA

1. Geographic Area

Electricity generated by the Emery plant would be added to the

Company's distribution system and would thus impact UP&L's total service area. The Company projects normal demand growth for its entire distribution system, and it can be assumed that the impacts would be proportionate throughout. The magnitude of the impacts cannot be predicted, but they can be expected for the duration of the life of the plant and would extend over all service divisions of the Company.

Impacts would include residential and industrial amenities and needs normally satisfied by electricity as a primary or alternative source of energy. Also, industrial and residential growth could be accomodated and would probably be encouraged.

Increased air and noise pollution could attend some new industries. The employment of new workers who would be encouraged to migrate into the Company service area, could result in impacts. The impact would include added air and noise pollution and congestion because of increased traffic. The additional population would increase the demands for public services, such as hospitals, physicians, police protection, street construction, culinary water, and sewer systems. The severity and significance of these impacts would depend on local situations and would be greatest where services are already under stress. Such conditions cannot generally be pinpointed because of the constant change in growth patterns throughout the service area.

2. Population

Exactly how increased electricity would affect population characteristics is unknown. However, in terms of demographic patterns, along the Wasatch Front there could be an expansion in existing urban areas. Some of the expansion could occur in the small towns (10,000 or

less) along the Front.

Increased electricity in the Uintah Basin would encourage increased urbanization as new energy programs developed, such as oil and gas development, and an oil shale industry (Moon Lake Electrical Association).

Migration of low income or unskilled employees (and their families) in and out of the market area, may be expected to decrease due to an increased demand for skilled labor to fill occupations associated with manufacturing and commercial organizations.

3. Employment

The magnitude of the impact of an additional 860-MW electrical power complex in terms of employment patterns is unknown, primarily because the increased amount of electricity would be used for normal needs of local customers.

Increased electrical power could increase the numbers of persons in the labor force, but probably would not significantly affect the percentage of workers in various job locations or categories. Jobs would increase generally throughout the market area for all skills and professions. The only exception could be the slight expansion of the skilled labor force. The increased power would probably increase the percentage of permanent jobs available (Battelle, 1973).

Income characteristics of the market area would not substantially change except in the rural areas. There may be a slight increase in per capita and in labor force income. The number and types of new jobs which the increased energy output could create is unknown.

4. Manufacturing and Mining

a. Phosphate Fertilizer Production

Energy from the Emery project would be used in the production of phosphate fertilizer by the Agricultural Products Company near Soda Springs, Idaho. There would be environmental, employment, and population impacts associated with this operation. An ES being prepared by USGS will disclose the features and impacts of this industry in detail.

b. Copper Mining and Manufacturing

The Kennecott Corporation plans to retire its generating plant near Magna and run its copper mining and manufacturing operation in the Salt Lake Valley using 59 MW of power from the Emery project. Impacts would include some lost jobs at the Kennecott electrical generating plant, and a reduction of air pollution in the Salt Lake Valley by about 4,000 tons of particulates and 2,000 tons of SO_2 per year (EPA, 1972).

c. Copper Mine Operation

Anaconda Copper Company would use 50 MW of Emery power to develop an underground copper mine near Tooele, Utah. About 1,000 construction workers would be needed to start the operation, and 750 to 800 employees would be required for production of approximately 10,000 tons of ore and 500 tons of concentrate daily, which would be shipped to Montana for smelting. There would be no local air quality impact from the hydrometallurgical separation process. Waste rock and waste water would be slurried to a 150 surface acre tailings pond. Approximately 1,500 gallons of water per minute would be used from a live spring near the concentrator. The work force is expected to come from the existing

Tooele-Salt Lake City population. Minor population-oriented impacts are expected. The life of the operation would be approximately 20 years.

P. RESTORING THE GENERATING COMPLEX SITE TO ORIGINAL CONDITION

It would be possible to remove the permanent structures and to shape the topography of the land to approximately the same contours as before work was started at the site. It would, however, be impossible to restore the original geologic bedding or the original stability. Because of this disturbance, the topography would soon erode into forms different than the original hills and mesa.

Approximately 1,506 acres of land would be severely disturbed or occupied at the site. About 396 of these acres, originally covered with greasewood, riparian vegetation, and saltgrass, have been buried under several million cubic yards of structural fill, and could never be restored. As vegetation is generally a function of precipitation, the vegetation of the area would likely evolve to the saltbush type over an unknown, but undoubtedly long, period of time if the structural facilities were removed. The site would also need protection from additional man-caused disturbances, including grazing, or the succession of vegetation to the saltbush type would be delayed indefinitely.

In order to restore the original water table, the drains would have to be removed or plugged. This would also eliminate the saline discharge.

The pheasant habitat (approximately 900 acres), comprised of agricultural areas and riparian vegetation, would be buried under several million cubic yards of structural fill or occupied by permanent structures and would probably never be restored.

Restoring the site to nearly natural scenic quality would require the removal of all above-ground structures and buildings. Form, line, and color could be easily restored. However, because of the drastic change in vegetation, it would be many years before original texture would be restored.

If structures and facilities were removed, the entire 1,600 acres of former agricultural land could be put back into production. In addition, the 396 acres that have been covered to date with structural fill could be made into productive agricultural land with special tillage and preparation.

There is no legal authority which could force UP&L to remove the existing structures at the construction site should the project be disapproved. The plant could be dismantled, but the money and time spent would be substantially greater than any salvage value returned.

Presently, about 80 percent of the highly reinforced concrete has been poured. As of the middle of December, 1976 at least 90 percent of the concrete (104,400 cubic yards) is in place. Over 50 percent of the steel superstructure is in place, and at least 50 percent of the structural steel (12,435 tons) is erected.

The cost of dismantling the steel for reuse would cost more than the cost of buying new steel. Furthermore, the value of the site is very low. Thus, if the project were disapproved, the plant would probably be abandoned, leaving the superstructure and concrete construction in place.

Socioeconomically, there would be two major impacts from denial of the project proposal. First, there would be a net loss of

approximately 4,500 people and 1,500 jobs in Castle Valley. In reference to this possibility, outward movement of the temporary construction work force may be followed by a slight local economic downturn. However, because of non-Emery project economic growth occurring in the locality, this would likely have little impact. Secondly, there would be a loss of over $27 million in assessed property evaluations, and a reduction of about $1.4 million in taxes for Emery County.

Both Carbon and Emery counties have sold large bonds, totaling $4,277,000, to provide needed community improvements. Were the Emery project abandoned, both counties would feel the loss. Emery County would be hardest hit since the county would receive the property taxes. If the anticipated taxes were not forthcoming, the County would not be able to pay off the bonds. Carbon County would feel the loss only to the extent that fewer homes would be built, thus creating a reduction in property and sales taxes.

If the Emery project were abandoned, but coal mining continued to expand along with other industrial development, the socioeconomic impacts could be quite serious. The major occupation in Carbon and Emery counties is coal mining. Mining does not pay directly or indirectly severance or property taxes to city and town governments. Yet, miners add demands to provide more community services.

Power plants, on the other hand, do pay large amounts of property tax and the assessed valuation of the plants can be quite high. The money from the property tax from the plant that would be lost could not, therefore, be used to provide community services which would mitigate some of the social impacts.

CHAPTER 4

MITIGATING MEASURES

CHAPTER 4

MITIGATING MEASURES

A. INTRODUCTION

This chapter summarizes those measures that would be taken to mitigate the adverse impacts to the human environment as described in the previous chapter. Mitigating measures which are an integral part of the Company proposal are not discussed in this chapter. Mitigating measures discussed here could be expected because of existing laws, court precedent decisions, agency policy, or firm Company commitment. Mitigating measures which are actually feasible, committed, and enforceable by government agencies or the Company are presented in three parts:

1. Measures required of the applicant by federal agencies.
2. Measures required of the applicant by state and local entities.
3. Applicant committed measures.

This chapter identifies the impact to be mitigated, the measure that would be required under the agency's authority, and the Company's specific commitment. It then evaluates the mitigating measure, its effectiveness as it would function, and the specific actions that would be required to implement it. It should be understood that some of the mitigating measures that would be required by governmental agencies have also been agreed to by the Company.

Because it is difficult to differentiate between mitigative and alternative courses of action, mitigation is defined here as any action which could be taken to reduce or eliminate impacts within the basic proposal. Alternatives (discussed in Chapter 8) also may reduce or eliminate impacts, but would require a change in the basic proposal.

For example, to paint transmission poles to blend with the environment would be a mitigating measure and would be discussed in this chapter. To reroute a transmission line would be an alternative action discussed in Chapter 8.

The Federal Government has mandates to protect threatened and endangered species and their critical habitat, historical and archaeological resources, and wild horses and burros. For the purpose of this statement it is assumed these mandates will be carried out. Also it is assumed that sufficient funding and manpower would be avoidable to properly enforce the required mitigating measures set forth herein.

B. MEASURES REQUIRED OF THE APPLICANT BY FEDERAL AGENCIES

If the proposed project were approved, the applicant, under federal law, would be required to carry out the following measures on Bureau of Land Management (BLM), U.S. Forest Service (USFS) and Bureau of Reclamation (USBR) administered lands.

1. Restrict clearing to the minimum. Scalping of top soil would not be permitted. Access roads and structural sites would be cleared with Klear-Way, Hydro-Axe or similar equipment. Dozer-, blade-, or ripper-equipped track vehicles would not be allowed except for road, pipe line, and coal conveyor construction. Where topographic features restrict use of this equipment, areas would be cleared by hand. Vegetative mulch would be scattered over cleared areas. Only vegetation within 20 feet of the conductors on transmission lines would be cleared.

Klear-Way or Hydro-Axe equipment would be used along the 20 miles of temporary access roads to retain intact the root portions of the vegetation. Vegetative mulch would be scattered over the cleared areas.

Klear-Way or Hydro-Axe equipment would be used at the power line tower pads. Trees, a distance of 20 feet or more from the conductor, would be trimmed, but not removed. Vegetative buffer zones at least 15 feet in width would be maintained adjacent to streams and river banks at all crossings.

2. Restrict travel to rights-of-way and existing public roads. Cross-country motor vehicle travel would be prohibited. Only established or marked roads would be used. Vehicle travel for engineering and construction purposes would be prohibited during the spring thaw and runoff (when roads and soils are muddy) to avoid rutting, soil damage, and possible soil movement.

3. Construct water bars on access roads to curtail soil movement and to divert runoff to natural drainages. Maximum spacing between water bars would be:

2 percent grade or less	-	400 feet
2 to 5 percent grade	-	200 feet
5 to 8 percent grade	-	100 feet
10 percent or more	-	50 feet

4. Construct roadside drainage ditches to reduce water flow and velocity. Drain ditches would be dug at the same intervals as described above. Roads would be "out-sloped" as much as possible. Berms would be removed.

5. Maintain all stream channels and washes in natural state. If drainages are crossed, dirt fills or culverts would be placed and removed upon completion of the project.

6. Seed disturbed areas after completion of construction during seasons when adequate moisture for germination and growth is available. If vegetation fails to establish within 3 years, the area would be reseeded until revegetation was accomplished.

7. Seed cuts and fill banks by hand in high erosion hazard areas, and mulch or use Hydro-Mulch equipment. Adapted sod-forming grass would be used where possible. Raw banks which cannot be seeded would be chemically or physically stabilized.

8. Install culverts at points where access roads cross live streams. Energy dissipators would be constructed at the downstream end of each culvert to prevent erosion. Culverts would be removed from all roads abandoned after construction.

9. Use helicopters to erect towers where access across the natural terrain precludes rubber-tired or track equipment, i.e., that portion of the Emery-Spanish Fork Canyon-Camp Williams line from Diamond Fork (milepost 76) to the mouth of Spanish Fork Canyon (milepost 82).

10. Prohibit blasting within 50 feet of all live streams and springs.

11. Cease transmission line construction work located on federal lands in critical deer, elk, and nesting waterfowl habitat areas during the following dates:

a. Emery-Spanish Fork Canyon-Camp Williams Transmission Line:

From January 1 to April 30, on deer and elk winter range from Tie Fork to Billies Mountain (miles 59 to 70); Billies Mountain to Diamond Fork (miles 73 to 75); Diamond Fork to U.S. Highway 89 (miles 77 to 80).

From March 1 to June 1 on waterfowl areas of Provo Bay and Powell Slough (miles 90 to 95).

b. Emery-Salina Canyon-Sigurd Transmission Line:

From May 15 to July 15, on elk-calving and deer-fawning areas from Flat Top Mountain to Oak Ridge (miles 47 to 53). From January 1 to April 30, on deer and elk winter range (miles 35 to 65).

12. Locate roads and transmission lines to follow natural contours. Revegetate all disturbed areas with vegetative species indigenous to the site and planted in a pattern which would compliment the line form, color, and texture of the site. A BLM or USFS landscape architect must be consulted before revegetation procedures begin on respective lands.

13. Prior to construction, a BLM or USFS landscape architect would be consulted on respective lands to select colors which will help blend structures with that of the natural landscape.

14. Where possible, screen towers and access roads from highways, or locate such structures and roads beyond view distance from highways or other public scenic areas. The applicant would prepare a screening plan to keep structural areas away from public view, and would submit the plan in writing to the appropriate agency and obtain approval before starting construction.

15. Remove each day, all trash, packing material, and other refuse.

16. Install nonspecular conductors and compatible insulators in the following areas:

a. Emery-Salina Canyon-Sigurd Transmission Line

(1) One mile beyond each side of Utah Highway 10 south of the town of Emery.

(2) From Saleratus Creek to Lost Creek (miles 35 to 65) on Fishlake National Forest land.

b. Emery-Spanish Fork Canyon-Camp Williams Transmission Line

(1) From Tie Fork to Billies Mountain (miles 59 to 70).

(2) From Billies Mountain to Diamond Fork (miles 73 to 75).

(3) From Diamond Fork to U.S. Highway 89 (miles 77 to 80).

All the areas above are on Uinta National Forest Lands.

17. Reroute or rebuild all access roads on federal lands blocked as the result of construction of project components.

Authority requiring the above actions (Items 1 through 17), which would mitigate soil erosion, siltation, loss of wildlife habitat, aesthetics, and recreation on federal lands, is granted under the following acts:

Bureau of Land Management and Bureau of Reclamation:

Coal Haul Road - Right-of-Way Act of January 21, 1895.

Water Supply Pipe Line - Right-of-Way Act of February 15, 1901.

Transmission Lines - Right-of-Way Act of March 4, 1911 and
Reclamation Act of June 17, 1902.

U.S. Forest Service:

All actions - Organic Act of June 4, 1897.

18. Prior to any and all surface disturbance a qualified archaeologist, either designated or approved by the responsible land managing agency,

will be consulted. The archaeologist will show the agency surface protection specialist, company representative, and equipment operators the location of all archaeological sites before any surface disturbance occurs to eliminate the possibility of inadvertant damage. If the archaeologist determines that cultural values will be disturbed, construction will not proceed until appropriate action can be taken (i.e., salvage, relocation, etc.).

19. Cease construction if relocation of any facility is impossible or if previously undiscovered buried cultural resources are encountered after construction commences. Work would be stopped until appropriate action (salvage, rerouting, or other protection) is determined by such federal agencies involved.

20. Disturbance will not be allowed on any site that has been identified as potentially eligible for nomination to the National Register of Historic places.

The above three mitigating measures (Items 18, 19, and 20) are authorized under the Historical Preservation Act of 1966, Executive Order 11593 of 1971, and the Archeological and Historical Data Preservation Act of 1974.

21. Conduct an intensive survey of all rights-of-way corridors and associated access roads, so that paleontological resources can be evaluated or salvaged. All construction in areas of discovery would be halted until the appropriate federal agency could determine the proper course of action (including evaluation, salvage or protection). Protection of paleontological resources is covered by the Antiquities Act of 1906, and

the National Environmental Policy Act (NEPA) of 1969.

22. Comply with safety regulations imposed by the Mining Enforcement and Safety Act of September 16, 1966, and the Occupational Safety and Health Act of 1970. Comply with the Federal Aviation Administration clearance standards, granted under authority of the Federal Aviation Act of 1958. Comply with grounding and clearance requirements of the National Electric Safety Code.

C. MEASURES REQUIRED OF THE APPLICANT BY STATE AND LOCAL ENTITIES

1. The same mitigating measures on state and local government lands could be required as on federal land. Authority is granted to the State of Utah under the Utah Code Annotated (UCA) 1953, 65-2-1.

2. Require the same mitigating measures as required by the federal agencies or by the Utah State Antiquities Act regarding cultural and paleontological resources.

3. Install guard rails meeting Utah State Highway Department specifications to protect towers constructed within the highway right-of-way. Authority is granted through UCA, Sections 27-12-11 and 27-12-134 which authorize the State Highway Commission to regulate and issue permits for construction of facilities within highway rights-of-way.

D. APPLICANT COMMITTED MEASURES

1. The applicant is committed to mitigate soil erosion and vegetative losses by the curtailment of unnecessary disturbance or vegetative clearing, or by any disturbance of the surface along rights-of-way corridors. The applicant would seed with native or introduced vegetation

all those disturbed areas not permanently occupied by structures or maintained as a roadway. The applicant would construct surface drainage facilities at the plant site to minimize erosion and any subsequent sedimentation of Rock Creek.

2. Visual impacts resulting from the construction or existence of a project component would be partially mitigated by the applicant through the following actions:

a. Roads would be either constructed with a hard surface, or would be sprinkled to reduce dust during construction.

b. All buildings would be colored to blend with surrounding landscape character.

c. The plant site would be landscaped with native vegetation and grasses.

d. Structures and facilities would be designed and constructed with architecturally-pleasing lines.

e. Only vegetation within 20 feet of the conductors would be cleared from the rights-of-way along transmission line corridors, and only as necessary for road construction.

f. Disturbed and regraded areas would be completely revegetated.

Applicant committed measures are in accordance with UP&L letter of April 2, 1974, to BLM, and the applicant's Environmental Analysis, October 1973, as revised, November 1973.

E. EVALUATION OF MITIGATING MEASURES

In this section, each environmental component to which some mitigating measure can be applied shall be evaluated. The extent to which the impact can be mitigated is discussed. Those impacts, or parts thereof, that cannot be mitigated are discussed further in Chapter 5.

The discussion of effectiveness shows, where possible, the relationship of mitigating measures to changes in duration, intensity, incidence, and magnitude of impacts described in Chapter 3.

1. Soils

Through mitigating measures (listed previously in sections B, C, and D above), erosion would be reduced on disturbed areas by restoring the natural cover protecting the soil and by reducing the velocity of surface runoff. The amount of erosion that would be reduced is unknown.

It is estimated that accelerated erosion would be halted through rehabilitation, which increases ground cover and reduces water velocity, within 2 or 3 years on the 192 acres that have greater than 50 percent chance of normal range seeding success. An estimated 10 years would be required for the 48 acres in moderate to low erosion hazard areas, having less than 50 percent chance of seeding success. An estimated 20 years may additionally be needed to rehabilitate the 109 acres disturbed on highly erodible soils with less than 50 percent chance of range seeding success.

The evaluation assumes that mitigating measures would occur on state and private land as outlined, but there is no assurance that the measures would be enforced on other than federal lands.

2. Vegetation

Through mitigation on disturbed areas (paragraphs B,6 and B,7 above) where vegetation is removed (349 acres), the vegetative cover and production would be restored within 2 to 3 years on the 192 acres that have a greater than 50 percent chance of normal range seeding success, and within 10 years on 48 acres in moderate to low erosion hazard areas, with less than 50 percent chance of seeding success. It is estimated that 20 years may be needed to revegetate the 109 acres disturbed on highly erodible soils with less than 50 percent chance of range seeding success.

3. Water Resources

Decrease in soil erosion and establishment of ground cover through mitigation (paragraphs B,1 through B,9; C,1; and D,1 above) would reduce siltation and degradation in water quality by an unknown amount.

4. Wildlife

Deer and elk are very sensitive to harassment during the fawning and calving season and during the later months of the winter season. Female deer and elk have been known to abandon their young if harassed. Also during January through April, deer are in a weakened condition and any disturbance can cause them to go into shock which may cause death. Mitigation would save an unknown number of deer and elk on federal land along the transmission line corridors (paragraph B,11). Scheduling of construction activities in the Provo Bay and Powell Slough areas would eliminate lost production of waterfowl, shorebirds, or

raptors. However, there are no regulatory laws or other incentives to guarantee that these measures would be performed on other than federal lands.

5. Cultural and Paleontological Resources

The Federal Government seeks to preserve and protect prehistoric and historic cultural values from inadvertent damage or loss through field identification and evaluation surveys (paragraphs B,18; B,19; B,20; B,21). Relocation of project components would be required in order to avoid and protect unique archaeological resources. Salvage action would only be a last resort measure after all other feasible means to preserve or protect a resource in its original condition and context have been explored.

Any changes in alignment, adjustment, or relocation of the proposed facilities would then also have to be surveyed. This procedure would protect sites not previously subject to direct impact that may have become endangered as a result of route change or relocation of facilities.

The effectiveness of field surveys is limited to the skills of the evaluator. Thus, the survey can only evaluate visible cultural data. If a buried site is discovered, the chances of federal representives being on the scene would be slim. Therefore, the effectiveness of this mitigation would be less than described.

Protection of archaeological and paleontological resources under State of Utah jurisdiction is improving through use of identification, evaluation, and salvage operations.

The Federal Antiquities Act of 1906 provides for the protection

and preservation of vertebrate fossils of an actual historic or scientific interest, or of some unusual significance. Similarly, NEPA could be interpreted to include paleontological values under Section 101 (b). This section directs all federal agencies, "to preserve important historic, cultural, and natural aspects of our National heritage...". In order to insure adequate protection and proper preservation, such measures as survey, evaluation, relocation, or salvage may be deemed necessary. Presently, the law would pertain only to federally-administered lands.

6. Scenic Resources

Qualified field specialists from each federal agency involved would aid in the preparation of a "construction plan." This document would assist in assuring compliance to the applicable mitigating measures listed in paragraph B above. Action would take place "on the ground" over the entire system involving federal lands to assure that visual contrasts would be reduced by revegetation, vegetative screening, restricted trimming, route selection, minimal soil disturbance, dust control on new construction, installation of nonspecular conductors, and selection of compatible paints or material colors for all structures.

Implementation of mitigating measures would reduce visual contrast impacts from vegetative clearing, skylining, and highway crossing along the Emery-Spanish Fork Canyon-Camp Williams, and the Emery-Salina Canyon-Sigurd transmission lines. The extent of mitigation cannot currently be ascertained, but it would be considerable.

7. Land Use

Access into the Provo Bay area for fishing, hunting, and other

recreational activities would be guaranteed by implementing the mitigating measure listed in paragraph B,17.

8. Human Resources

Many mitigative actions have taken place to alleviate impacts upon the human environment prior to preparation of this ES. These have been described as part of the existing environment and can be found in Chapter 2.

Mitigation of additional impacts to human resources, identified in Chapter 3, cannot be considered real and committed, the reason being that these mitigations cannot be established or enforced by those federal agencies now preparing the ES, who are involved in the federal actions (permits, leases, etc.) required for construction of the project.

9. Human Health and Safety

Frequent mine safety inspections by Mining Enforcement and Safety Administration (MESA) personnel (paragraph B,21) including timely corrections of deficiencies in equipment, methods, and safety and first aid training, should significantly reduce the possibility of losses due to accidents. It is not known whether an adequate number of MESA employees would be available to provide the needed supervision.

Adherence to Occupational Safety and Health Administration (OSHA) safety standards (paragraph B,22) should mitigate losses from accidents during construction of the generating complex and the transmission lines.

Adherence to prescribed clearances and grounding procedures would reduce or eliminate hazards to humans in populated areas crossed

by transmission lines. Guard rails at tower sites within the highway right-of-way would reduce the possibility of towers and highway blockage. Potential losses are unknown.

Navigation markers on the transmission lines near the Provo Airport would reduce the possibility of aircraft flying into the transmission line. The number of such accidents is unknown.

F. MONITORING REQUIREMENTS

1. Emissions

Certain emission monitoring requirements would be performed by the applicant on a periodic basis. Monitoring records would indicate whether emission standards were being met or exceeded.

New Source Performance Standards (NSPS) and air emission regulations for fossil fuel-fired steam generators require that a plant the size of that proposed for Emery must install continuous in-stack monitoring systems for the measurement of opacity of emissions and SO_2 (40 CFR 60.40). The Environmental Protection Agency (EPA) would determine compliance with the NSPS by relying primarily on the records received from the emission monitoring systems installed.

National pollutant discharge elimination permits and water discharge regulations require that each pollutant for which a permit has been written be specifically sampled on a periodic basis.

2. Subsidence

The mining supervisor (USGS, Salt Lake City) would require the Peabody Coal Company to install a subsidence monitoring system to determine the extent of any area that may be affected (Coal Mining Operating Regulations, Federal Register, Volume 41, No. 96).

CHAPTER 5

ANY ADVERSE IMPACTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSAL BE IMPLEMENTED

5

CHAPTER 5

ANY ADVERSE IMPACTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSAL BE IMPLEMENTED

A. INTRODUCTION

This chapter summarizes adverse impacts which would affect the human environment and which cannot be avoided should the proposal be implemented. The mitigating measures in Chapter 4 have been subtracted from the total impacts described in Chapter 3. The remaining adverse impacts are set forth herein. Alternatives are discussed in Chapter 8.

B. CLIMATE

According to the National Oceanic and Atmospheric Administration (NOAA), 1975, there are presently insufficient data to say whether climate will or will not be influenced by this proposal or any other proposed energy development in the Southwest.

C. AIR QUALITY

1. General

The discharge of pollutants into the atmosphere, such as sulfur dioxide (SO_2), nitrogen oxides (NO_x), particulates, trace elements, cooling tower salts, coal mine emissions, coal dust, auto and truck emissions, and fugitive dusts, is an unavoidable impact.

2. Specific

a Sulfur Dioxide

Uncontrolled SO_2 emission rates would be approximately 83 tons per day using average grade coal, or 92 tons per day using worst grade

coal. The annual emissions of SO_2 would be approximately 24,236 tons. The SO_2 emission rates would be within federal and state air quality standards, but would represent some unavoidable air quality degradation in the area.

An increase in population by 5,000 people could result in an increase in SO_2 of approximately 200 tons per year, which would be mainly due to automotive emissions. These increased emissions due to human activity would be equivalent to approximately 1 percent of the SO_2 emitted from the plant.

b Nitrogen Oxide

Other than by controlling boiler temperatures and firing methods, there are no systems yet available for controlling NO_x emissions from the generating complex. Emission rates would be 70 tons per day or approximately 20,440 tons per year. These emission levels are within allowable limitations and would not produce ambient air levels higher than allowed by the National Ambient Air Quality Standards (NAAQS).

c Particulates

Proposed emission controls for the Emery plant could limit particulate release to 0.5 percent of the total fly ash produced during combustion. Assuming 99.5 percent control, particulates released would amount to 4.29 tons daily using average grade coal, and 5.29 tons per day using worst grade coal, which would equal approximately 850 tons per year. Based on the operating experience thus far at the Huntington plant, 99.5 percent particulate control would be expected at the Emery plant with the equipment functioning nearly 100 percent of the time.

No adverse impact on human health and welfare would be expected from these releases; however, the emissions would result in an additional particulate burden.

With an estimated population increase of 5,000 increasing particulates, generated by transportation, solid waste disposal, residential and commercial fuel consumption, and miscellaneous sources, would represent an estimated 314 tons of particulates per year. This amount represents about 26 percent of the estimated total that would be produced by the plant. Although minimal, this impact could be of greater importance than particulate emissions from the plant since these emissions, by nature, would be of low level release, subject to more restrictive dispersion. The impact would be of local influence on visibility and aesthetics.

d Trace Elements

The coal that would be burned at the generating complex contains small amounts of trace elements and radionuclides which would be released to the atmosphere during the operation of the plant. Emission levels and atmospheric ground level concentrations of these elements are calculated to be low, within or below allowable levels defined for trace elements of concern, i.e., mercury and beryllium. Such trace metals may eventually accumulate in some ecosystems near the plant, but there are presently insufficient data to determine the amounts.

A trace element study was conducted in 1971 at the Four Corners power plant (2,000 MW) after the plant had been in operation 8 years. Data from samples of soils and plants collected were compared with data collected for a similar study conducted 10 years earlier. The content of potentially harmful trace elements in vegetation in the area surrounding

the Four Corners power station was determined to be very low as compared to the average concentrations in the United States. Mercury concentrations found in surface soil samples were found to be less than 0.01 to 0.03 part per million (p/m). Mercury concentrations were all lower than the 0.11 p/m reported by Swain (1955) for an average soil. Mercury was below the limits of detection at distances greater than 2 miles from the generating site (Southwest Energy Study, 1972).

A second comprehensive trace element study was completed by the Atomic Energy Commission (AEC) under the support of the National Science Foundation (NSF) around the Allen steam plant (870 MW) in Memphis, Tennessee. The study concluded that the Allen plant emissions, after over 14 years of operation, had no major impact on trace element concentrations in the environment (AEC, 1973).

e Visibility

Estimated NO_x production levels from the Emery plant would be within a range sufficient to produce nitrogen dioxide (NO_2) in concentrations which could result in a visible, yellow discoloration under restrictive dispersion conditions. Similar emission rates and meteorological conditions existing at the Huntington plant have not produced visible discoloration. Such a possibility, however, should be recognized at Emery.

f Steam Plume

Formation of a white, visible plume of condensing water vapor would occur during operation of the plant. Density and length of the plume would depend upon temperature and humidity. Because of the nature of the wet-dry cooling tower, the plume would occur infrequently, but

the effects would possibly result in an aesthetic impact.

Salt dispersion from the cooling tower would occur. The estimated amount would be approximately 350 tons yearly. Potential environmental consequences are expected to be minor and restricted to a local area within the immediate vicinity of the power generating complex.

D. GEOLOGY AND TOPOGRAPHY

Subsidence could occur on 4,658 acres where the Hiawatha and Bear Canyon coal seams would be mined. It is not possible to determine exactly how deep the land would subside, however, the depth could be as much as 10 feet (Brauner, 1973). A relatively narrow peripheral zone around the leased area would also experience some subsidence, but this would be hardly discernable. There are presently insufficient data to estimate the extent of occurring surface fractures, bulges, and sinkholes.

E. SOILS

Off-road vehicle (ORV) use (11,000 visitor days by 1981) by an increased population related to the Emery project would cause cumulative soil erosion effects in Castle Valley and on the San Rafael Swell. An area encompassing an estimated 2,500,000 to 3,500,000 acres would be affected for the life of the project.

Surfaces covered by structures, including buildings, roads, conveyors, etc., would amount to a loss of potential productivity on an estimated 1,788 acres. The loss would continue for the life of the project. Approximately, 1,506 acres of soils at the plant site have already been disturbed and permanent structures are being constructed. This loss of soil productivity would be of local significance.

For 3 years during construction, soil productivity would be lost on the 349 acres that would be disturbed, and erosion would be accelerated on 195 acres. Lost production and accelerated erosion would continue for 10 years on 71 acres, and for 20 years on 109 acres. About 3,600 tons of soil would be lost in the San Rafael drainage. Total loss in other drainages is presently unknown, but would be expected to be less than in the San Rafael.

F. VEGETATION

Of the 1,788 acres that would be permanently occupied, vegetation has already been removed from 1,506 acres; permanent structures are being constructed.

The acreage would be permanently occupied for the lifetime of the generating complex, eliminating the production of vegetation for that period. Loss of this vegetative production would be irreplaceable on the site. The loss would be of local importance only.

Vegetative production would be reduced on 349 acres disturbed during construction. Vegetative production would be lost for 2 to 3 years on 192 acres that have a greater than 50 percent chance of success in a normal range seeding operation, and for 10 years on 71 acres in moderate to low erosion hazard areas with a less than 50 percent chance of seeding success. It is estimated that 20 years may be needed to restore vegetative production on the 109 acres disturbed on highly erodible soils with less than 50 percent chance of range seeding success.

G. WATER RESOURCES

1. General

Project workers and service personnel, and their families,

while pursuing various off-the-job recreational and domestic activities, would introduce some dissolved solids into the Colorado River system. It is estimated that these activities would increase the amount of dissolved solids in the Colorado River by about 320 tons per year. This would be minimal compared to the nearly 8,000,000 tons flowing annually out of the Upper Colorado River Basin.

By 1981, the influx of 5,085 persons would increase the demand for domestic water in the area. The quantities of additional water needed have been estimated to be 1,322 to 1,729 acre-feet per year. Approximately 340 to 506 acre-feet per year of additional water could be supplied from the Ferron, Cottonwood, and Huntington Creek drainages. These three creeks presently supply about 706 acre-feet per year for domestic purposes. To meet the greater demand for domestic water from the Ferron, Cottonwood, and Huntington Creek drainages, approximately 97 to 145 acres of land in Emery County could be retired from irrigation, with a change in the water use from agricultural to domestic.

2. Specific

Minute quantities of trace elements would be deposited on the surrounding terrain during the life of the power plant. Considering the low emission levels, the potential for deposition over wide areas, and the flowing streams and shallow water in the area, the possibilities are low for significant concentrations to occur in any particular area.

Subsidence following mining operations could intercept ground water aquifers above the mined areas. Springs, including nine that have been measured, could be affected with the possible loss of over 180 acre-feet per year of surface discharge. This subsidence could also

eliminate stream flow in reaches of Roan Canyon, Deer Creek, and in the headwaters of Grimes Wash. Estimates of the magnitude of impacts are unavailable for these three drainages (impacts could affect as many as 718 cattle on summer range). Similarly, Snow and Flag lakes might experience changes in water levels because of mine subsidence. Predictions of whether water levels would be raised or lowered by the changes are unavailable.

Reduction or changes in water sources could affect livestock grazing which is dependent on these waters. The magnitude of this impact cannot be estimated.

Construction of linear features of the project would cause an increase of surface water runoff resulting in increased sedimentation in washes and streams. Vegetative and soil disturbances could affect watershed characteristics associated with the control of surface runoff and sediment yields. Although the magnitude of such impacts cannot be estimated, it is likely that accelerated runoff would continue until vegetation is reestablished or until soils are otherwise stabilized on bare surfaces. Acreages that would be subjected to increased surface runoff and resultant sedimentation due to project activities are listed in Tables 3-6 and 3-7 in Chapter 3.

H. WILDLIFE RESOURCES

1. Terrestrial Wildlife

The increased population attributed to the Emery project would add to the pressure being exerted on wildlife - elk, deer, antelope, upland game birds, etc. - in terms of individual and habitat loss and harassment.

While the population increase associated with the Emery project would adversely affect these wildlife species and their habitat, it represents only a minor increment (about 12 percent) of the total increase which could be occurring and would occur by 1981 due to growth in Carbon and Emery counties (unrelated to the project). Presently, there are insufficient data to evaluate such impacts as they apply to the Emery project, but the impacts would continue through the life of the project.

Construction of the generating complex could remove 1,600 acres of agricultural land (retirement of farms) and 100 acres of riparian habitat for pheasants. Loss of habitat would reduce pheasant numbers in Emery County on an annual basis for the life of the project by approximately 240 cocks, 200 breeding hens, and 920 young.
which, in turn, would affect recreation activities in Emery County. Such losses would represent a 4 percent decrease in pheasant habitat in Emery County and a 4 percent decrease in pheasant numbers.

Were springs on the 4,658 acres above the mine to dry up as a result of subsidence, elk watering sources on summer range could be impacted. Presently, there are insufficient data to determine numbers of elk that could be lost or determine the degree of impact.

Disturbance of deer and elk winter range located on private lands along the Emery-Spanish Fork Canyon-Camp Williams transmission line from North Fork of Gordon Creek (mile 35 to 59); Billies Mountain (mile 70 to 75); and Diamond Fork (mile 75 to 77) would be expected to occur during the critical period (January 1 to April 30). Construction occurring during the January-April period would result in loss of an unknown number of deer and elk.

The Emery-Spanish Fork Canyon-Camp Williams transmission line would also pass through deer-fawning and elk-calving areas on private lands between Beaver Creek and Soldier Creek (mile 40 to 55, Appendix VI-3). The disturbance of this area would be expected during fawning and calving periods (May 15 to July 15). The construction could contribute to the loss of deer fawns and elk calves.

Of the 40 miles of access roads to be constructed, 37 miles would traverse private land through deer and elk winter range, and a fawning and calving area (mile 35 to 55, Appendix VI-3). Of the 20 miles of road that would remain open, the entire length could be on private land. If this were to occur, the road could be constructed during critical periods (January 1 to April 30, and May 15 to July 15). There are no data to quantify the impacts that could occur under this situation.

An increase of 12 percent (107) in hunter trips to the Desert Lake Waterfowl Management Area would further reduce the quality of the hunting experience.

2. Unique and Uncommon Species

Although the increased population would probably not significantly affect the moose herd by illegal kills, there would be added harassment to the herd.

Sightings of the American peregrine falcon in the generating complex area are too infrequent to form bases for determining impacts. In the Utah Lake area, the presence of the transmission line would be another flight hazard added to those already present. Because of the small number in existence, any losses of American peregrine falcon due

to collision with the lines would be significant.

3. Aquatic Wildlife

The demand for an increase in fish harvest (37,000 fish per year), caused by increased fishing pressure associated with Emery, would continue for the life of the proposal. However, fishing would become more competitive and less rewarding for the fisherman.

4. Waterfowl, Shorebirds, and Raptors

Loss of waterfowl, shorebirds, and raptors due to collision with wires cannot be avoided.

I. CULTURAL AND PALEONTOLOGICAL RESOURCES

Impacts upon the cultural and paleontological resources caused by an increasing recreational public in the secondary influence zone and outside could not be completely mitigated.

Impacts on archaelogical sites would include partial destruction or total loss of nonrenewable, irreplaceable, scientific information which would also be valuable for recreational and interpretative purposes. The amount of loss and the significance of the loss cannot be predicted.

Even with full implementation of proposed mitigating measures, damage and loss of values would still result to the cultural and paleontological resources. Damage could occur to subsurface values not initially discovered through field inventories. Current limitations in location, determination, recovery methods, and analytical techniques would result in destruction of certain contexts and relationships between specimens and their environment during operations proposed as mitigating measures. Removal of whole segments of the archaeological or paleontological

resources could seriously impair or prevent future opportunities for unbiased scientific investigations and use for recreational and educational purposes.

J. SCENIC RESOURCES

The power plant and associated facilities would change the natural landscape by creating a major industrial intrusion into a rural area. The effects would appear in the changes of color, form, line, and texture resulting from the clearing, grading, and development of structures, roads, dumps, evaporation ponds, conveyor systems, and power lines not in harmony with the natural setting. The impact of man-made contrast would be most severe in areas of high visibility along Highway U-10. Permanent facilities proposed would create a change to the landscape character that could not be avoided. The complex facilities would be visible for about 6 minutes along Highway U-10. Approximately 130 miles of transmission lines would be visible from highways. The lines would cross state and federal highways 16 times.

The coal source and associated facilities would change the landscape character by introducing additional man-made contrasts creating linear intrusions. Roads constructed in steep terrain would invariably leave portions of the road prism denuded of vegetation. The coal transportation system would create a visual instrusion by damaging the soil mantle and vegetative resource, leaving scars on the landscape that would diminish in time through revegetation. These scars would be seen for approximately 1 mile along highway U-29.

The primary impact of the transmission system would be the visual contrast created in the scenic resource. Regardless of the

number of mitigating measures applied, the transmission system would still create an intrusion into otherwise natural landscapes. Some skylining and encroachment upon scenic drives, natural areas, or other places of scenic quality, would be unavoidable. Vegetative patterns would be interrupted as structures were placed on the landscape. Soil movement would occur and the semiarid areas would recover at a slow rate.

Careful location of the transmission system, use of treated steel towers and nonspecular conductors, and minimum clearing of rights-of-way would reduce, but not eliminate, visual impacts. Table 3-10 provides a summary of critical types of contrast.

The transmission line from Gilluly (milepost 57) to the mouth of Spanish Fork Canyon (milepost 82) would be visually prominent, thus violating the U.S. Forest Service "Retention" classification. The intrusion would affect approximately 10 miles across the Uinta National Forest.

K. MINERALS

A maximum of 84,000,000 tons of coal would be removed, leaving behind an estimated 84,000,000 tons of coal lost to ultimate recovery. The loss (168,000,000 tons) of nonreusable coal reserve would be unavoidable. The tonnage loss would represent about 13 percent of the total known coal reserve in the East Mountain area, but less than 3 percent of the known coal reserves in the Wasatch Plateau coal field (Doelling, 1975).

L. LAND USE

Overcrowding and extensive use, including ORV activity, in 14

federal and four state recreation sites in the area would cause deterioration of physical features, natural environment, and scenic resources. Price City and Carbon and Emery counties would probably be unable to provide an additional 4 to 5 acres required for recreational facilities.

The changeover of 2,000 acres of land from agricultural to industrial use within the complex site, and the retirement of 2,940 to 3,031 acres of irrigated lands outside the complex would be unavoidable. This change in land use would result in the loss of the equivalent pounds of beef consumed by 3,280 people annually.

Removal of 20 single family residences and the loss of the opportunity to develop an additional 75 homes in Provo City cannot be avoided. The 75 homes would probably be built elsewhere in the county; however, the 75 lots would not be available for development.

An additional 16,000 visitor days spent fishing as a result of increased project-oriented population would result in an increased harvest of 37,000 fish annually by 1981. This may necessitate increased stocking of trout in order to maintain the present catch rate. Increased stocking of trout would increase operating costs of the fisheries program for the Utah Division of Wildlife Resources (UDWR).

An additional 4,500 visitor days of big game hunting would be expected to increase the harvest of mule deer by 7 percent (370 deer) annually in the Carbon-Emery county area.

The ORV use by people associated with the proposed project would be approximately 2,800 visitor days in 1976, increasing to an expected 11,000 visitor-days annually by 1981.

The above figures represent about 12 percent of the total

annual use expected by 1981 in the primary influence zone.

M. HUMAN RESOURCES

1. Demographic Trends

Population associated with the Emery project would increase by about 4,470 in 1976, peak at 5,075 in 1979, and would reach approximately 5,085 in 1981. A full operational and mining force would be on hand at the end of 1979. The high population level is expected to be of short duration - less than 3 months - since construction work is expected to drop dramatically in the fall of 1979.

2. Income and Employment

Income is expected to increase by about $14,994,000 by 1981 as a result of income generated by the Emery project. This income would benefit the Emery work force, but persons with fixed incomes in Carbon and Emery counties would experience reduced buying power.

Numbers of construction workers would fluctuate if the project were built, leading to some unemployment. Some construction workers, not phased from one plant to the next, would be forced to move out of the area. The exact number that would be forced out is unknown, but some workers would get jobs on other projects in the Carbon-Emery county area.

The construction workers, the plant operators, and the miners, all represent different employment groups, and if the project were approved, there would be an element of continuing change in generating complex employment until 1981. The employment would stabilize at 849 employees (miners, truckers, and operating personnel) in 1981.

3. Housing

The impacts on housing and community cohesion have already begun. The added population resulting from the project and the concurrent demand for housing, goods, and services already amounts to 25 percent of the expected demand for products and services. Presently, about 25 percent of the construction work force is in the area. These workers have found new homes. The Emery project, however, would affect the availability of housing for other people moving into the area.

The recent population increase has had a great effect on housing. Vacant and new housing is currently unavailable for any substantial influx of new population. New employees would face a severe housing shortage as well as a lack of mobile homes and motel rooms.

The greatest impact on housing would occur in 1977 when 860 owner and 905 rental units would be needed, and in 1979 when 970 owner and 904 rental units would be needed. In 1981, the housing needs for Emery would level off at 859 owner and 644 rental units.

With all available housing currently used to capacity, a shortage could continue for the next 5 years in Helper, Price, Huntington, Castle Dale, Orangeville, and Ferron. About 1,500 new homes would be needed to accomodate the new employees for the Emery project. It is predicted that the cost for housing would continue to rise.

Removal of 20 homes in the Provo City area and relocation of approximately 70 persons cannot be avoided. Plans for a nursing home and condominium development would have to be altered.

4. Local Government

The organization of local government would not change, although

local elected officials could be displaced.

5. Water Supplies and Sewage Disposal Systems

Currently, water systems are unable to satisfy demand and this problem would continue for some time if the project is approved. Additional water and sewer systems would be required to meet anticipated needs. Such facilities would be needed for an estimated 1,500 new homes.

6. Education

One hundred and nine Emery project-related, school-age children were enrolled in 1976; this number is expected to increase to 396 by 1977. The 1978 enrollment (resulting from the new population) would increase to 1,222 pupils (Table 3-18, Chapter 3). By 1983, new school enrollment would probably drop to around 1,000 students.

Approximately 53 additional classrooms and 55 new teachers would be needed to accomodate the anticipated 1,222 new students.

Added costs for the additional students would include at least $1.24 million in educational expenses plus operation of new facilities. The location of such facilities would depend upon where the new population settles. In a growing community, teacher salaries may have to be higher than the state average in order to attract teachers to the area with the probability of only temporary employment and inflated housing costs.

7. Public Safety

The Emery project would increase the need for police in the impact area. Nine additional police would be needed.

If the project were approved, all communities would need improved fire protection. Price would require a full time fire department,

requiring an investment of $70,000 in improvements and equipment. Other communities would need additional equipment and firemen (volunteer).

8. Public Health

Hospital facilities are already inadequate for a two-county area with a population over 26,100. As the population increases, the need for more hospital beds would increase. The number of needed beds cannot be assessed since many Castle Valley residents travel to Salt Lake and Provo for optional surgery. At present the Carbon-Emery county area has a shortage of 17 doctors. People wishing to see a doctor must wait several hours, and this condition would become worse as the population of the area grows. The increased population from the Emery project would require at least two additional doctors.

9. Quality of Life

A change in the quality of life would continue to occur as the population increases. The change could be considered adverse by some people.

The communities in Castle Valley have already experienced about 25 percent of the impact from the Emery project, the remaining 75 percent should occur within the next 4 years.

The changes in the availability of goods and services cannot be attributed to the Emery project alone, but to the general energy development in Carbon and Emery counties.

Local residents in Carbon and Emery counties report that the quality of police protection has declined, and that traffic, traffic hazards, and the noise nuisance are increasing. Local police also

report increased crime. A representative of the Carbon County Sheriff's office reported crime has doubled over the past 2 years, and that over 250 major complaints were filed in May 1976. Minor complaints were not recorded. The crime rate in Carbon County is expected to increase.

The crime rate in Emery County is also on the increase. The rate for all types of crime increased 327 percent over the last 2 years. The County now has a 24-hour dispatcher and has reopened the county jail. The Emery County Sheriff's department is also doing law enforcement for the communities in Emery County.

The present population expansion has decreased the quality of life in the impact area. The rapid growth associated with Emery would accelerate the demand for all kinds of community services beyond the available revenue sources. Inadequate services and intangibles could result in degradation in quality of life and a high turnover in employment.

The rapid population growth would bring about an increase in fringe settlements, wherein newcomers would lack adequate opportunity to identify with, and become involved in, existing community life. Low levels of social cohesion result in increases in psychological alienation. Alcoholism, drug addiction, and mental health problems would be likely results.

Such problems would be more likely to occur in an area that is culturally homogeneous, such as Emery County. If many of the employees come from other areas, they may not be accepted by current residents, and they may not make an effort to become part of the functioning communities. If this occurs, the quality of life for both long-term residents and newcomers may be reduced substantially.

Temporary disruption of lifestyles and relocation of 70 persons in Provo could not be avoided. Deterioration of scenic quality in this area due to the transmission line could not be avoided. Interference with television and amplitude modulation (AM) radio reception may be reduced or eliminated by antenna placement, filters, etc., but any residual effects could not be avoided.

N. HUMAN HEALTH AND SAFETY

Mine accidents could be reduced by improved mining and safety procedures. Mine accidents cannot be totally eliminated, however, nor can subsidence hazards. Mine deaths would probably occur at a rate of 0.04 per million man-hours worked. The rate of ORV accidents cannot be predicted.

Enforcement of Occupational Safety and Health Administration (OSHA) standards would reduce the accident incidence, but would not entirely eliminate accidents. Irregular inspections on a random basis may not be adequate to insure safe practices during the construction period.

In the more populated area of Utah County, the transmission line would present a hazard to persons working with long metal objects, and with kite flyers, hunters, and residents adjoining the line. Placement of guardrails at tower sites within highway rights-of-way would reduce, but not totally eliminate, the possibility of vehicle-tower collisions and the temporary blockage of traffic.

O. MARKET AREA

Adverse impacts in the market area would include increased air pollution, traffic congestion, and pressures on public services due to

expanded industry. Location and magnitude of these impacts cannot be forecast.

An industrial development with potential adverse impacts would be the phosphate fertilizer project proposed by the Agricultural Products Company, Soda Springs, Idaho. Unavoidable adverse impacts associated with this project will be discussed in an environmental statement presently being prepared by U.S. Geological Survey.

P. RESTORING THE GENERATING COMPLEX TO ORIGINAL CONDITION

Restoration of the original geologic bedding and stabilization of approximately 1,506 acres on the site would be impossible. About 396 acres of greasewood riparian vegetation, salt grass, and pheasant habitat at the complex site have been buried under several million cubic yards of fill material and could not be restored.

CHAPTER 6

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

6

CHAPTER 6

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

A. INTRODUCTION

This chapter discusses the extent to which the proposed Emery project would involve trade-offs between short-term commitments of resources and the long-term maintenance and availability of environmental values. The chapter also establishes the reduction of long-term opportunities that would result from short-term use.

Short-term is defined in this context as the lifetime of the generating complex; long-term as that period beyond. The applicant has indicated that the plant would be amortized over a 35-year period. However, after 35 years, the plant could still be operating, and if power from the generators were needed, the plant could continue to operate for an indefinite period of time. The Company has indicated that if the complex could no longer produce power economically, it would be shut down. Even then, it could remain available as an emergency back-up source of power, and if the generators at Emery were shut down, the transmission line would still be needed to transmit energy within the power grid (Thurgood, 1976c).

The overall short-term benefit would be the 860 MW of electrical power that would be produced. The benefit of this added energy would be experienced throughout the UP&L service area, providing the normal amenities of electrical power for population and industrial growth (Chapter 1).

B. CLIMATE

The plant would discharge gases and particulates from the stack and water vapors from the cooling towers. However, there is no evidence at this time to indicate that the atmosphere would sustain any long-term detrimental consequences which could affect the climate. Climatic effects are difficult to detect because the climatic change is a gradual phenomenon which takes place over a long period of years. Precise records are required to verify such changes.

C. AIR QUALITY

The present high quality of the atmosphere would be committed to a certain degree of degradation should the plant go into operation. The air in the area influenced by the Emery plant would be a receptor for combustion products of coal utilization (including sulfur oxides, nitrogen oxides (NO_x), particulates, sulfates, nitrates, trace elements, radioactive elements, carbon dioxide, water vapor, etc.). The estimated atmospheric concentrations of the products that would be emitted by the Emery plant would produce a minor or insignificant impact on soils, plants, and animal systems. However, very little is known about the cumulative long-term exposure of vegetation to these compounds.

Solid, liquid, and gaseous contaminants emitted to the air are ultimately removed at some rate by a number of processes, including deposition. Yet, in many cases, deposition rates cannot be predicted with a degree of confidence. The air residence times (amount of time pollutants remain in the atmosphere) of sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and particulates, however, generally vary from a few hours to a few days. Thus, duration of air quality degradation in any

particular area would coincide with the duration of the emission source in that area. For the Emery plant, the predicted concentrations of SO_2 as well as SO_2 plus NO_2 would be below levels that would acutely affect vegetative growth.

Sulfates, nitrates, phosphorous and trace elements released to the ecosystem have potential for long-term effect on soils, plants, and animals. Pathways of accumulation rates through the ecosystem of many of these elements generated by fossil fuel-generating plants, and the potential influence of these elements are only now being defined. Bioaccumulation and biomagnification, as defined for mercury (Standiford, et al., 1973) could occur with other trace elements. The release of small amounts of radioactive compounds to the atmosphere from coal combustion would cause only a small increase in radiation exposure of the general population. The accumulation of these compounds in the soil would be but a small addition to the existing natural radioactivity levels.

The interreactions of the predicted emissions from the Emery plant with predicted emissions from other power plants being considered, or with emissions from plants in actual operation in the region, deserve attention. The nearest facility is the Huntington Canyon plant. It does not appear that there would be any significant interaction of emissions from the Emery and Huntington power plants for averaging times of 24 hours or less. The plant sites are approximately 15 miles apart, and the wind circulations affecting the transport and diffusion of stack emissions are quite different at the two sites (Cramer and Bowers, 1976). Although the plumes from the two plants are unlikely

to affect the same point simultaneously, they would contribute to annual average concentrations of SO_2, NO_2, and particulates at some of the same points, especially in the area east-southeast of the mouth of Huntington Canyon. However, diffusion modeling has indicated that the maximum short-term and annual average concentrations in that area would be less than the maximum short-term and annual average concentrations produced within Huntington Canyon by emissions from the Huntington power plant alone.

Figures 6-1 through 6-3 are isopleth maps showing the predicted ground-level SO_2, NO_2, and particulate concentrations that would be produced by combined emissions from Emery and Huntington, assuming the Emery plant would not use flue gas desulfurization (FGD) on either unit and that the Huntington plant does use FGD on one of its two units. Figures 6-4 through 6-6 are isopleth maps showing predicted ground level concentrations for the same combined emissions, assuming Emery would use FGD on both units, and that Huntington would use FGD on one of its two units.

The proposed Emery plant would emit an estimated 77 percent of the 3-hour SO_2 National Ambient Air Quality Standard (NAAQS) within 3 miles of the site (Table 3-4). This would preclude development of other large SO_2 emitting industries within the immediate area of the Emery plant. However, concentrations rapidly diminish, and the plant emissions would have practically no effect on, or no significant interrelationship with, any other plant built in the valley more than 20 miles distant.

A preliminary study that considered available meteorological, air quality, and topographic data suggests that under stagnation conditions

FIGURE 6-1

ANNUAL AVERAGE GROUND-LEVEL SO_2 CONCENTRATIONS FROM EMERY AND HUNTINGTON COMBINED (EMERY WITHOUT FGD)

FIGURE 6-2

ANNUAL AVERAGE GROUND-LEVEL NO_2 CONCENTRATIONS FROM EMERY AND HUNTINGTON COMBINED (EMERY WITHOUT FGD)

FIGURE 6-3

ANNUAL AVERAGE GROUND-LEVEL PARTICULATE CONCENTRATIONS FROM EMERY AND HUNTINGTON COMBINED (EMERY WITHOUT FGD)

FIGURE 6-4

ANNUAL AVERAGE GROUND-LEVEL SO_2 CONCENTRATIONS FROM EMERY AND HUNTINGTON COMBINED (EMERY WITH FGD)

FIGURE 6-5

ANNUAL AVERAGE GROUND-LEVEL NO_2 CONCENTRATIONS FROM EMERY AND HUNTINGTON COMBINED (EMERY WITH FGD)

Universal Transverse Mercator-x and y Coordinates

FIGURE 6-6

ANNUAL AVERAGE GROUND-LEVEL PARTICULATE CONCENTRATIONS FROM EMERY AND HUNTINGTON COMBINED (EMERY WITH FGD)

there would be no interaction of emissions between the proposed Emery site, and the Navajo, San Juan, Four Corners, Huntington, and Mohave plants (Joint Meteorological Report, 1971). Air quality measurements made at Page, Arizona, near the Navajo plant, indicate that SO_2 and NO_x have remained at or near the limits of detection during the operating time of the San Juan and Four Corners plants (Dames and Moore, 1973; Walther, et al., 1974).

A study has been initiated by the BLM to determine if there would be any interaction between the existing Huntington, San Juan, Navajo, and Mohave power plants, and proposed development including Intermountain Power Project (IPP), Warner Valley, Harry Allen, Emery or oil shale (ERT, 1976). Preliminary results show, based upon several conservative assumptions to approximate the worst possible meteorological conditions, that several of the major emission sources would interact on a regional basis during a 24-hour time period. The study indicates the additive effect of any interaction would be small. The largest sulfur dioxide and total suspended particulate concentrations calculated would be no more than 6 percent of the NAAQS. Also, these maximum concentrations would be 25 percent of the Class II increments allowed by the Prevention of Significant Deterioration Regulations (PSDR).

The maximum interaction would occur during the winter months. Figures 6-7 through 6-9 show the convergence of smoke plume centerline for SO_2, NO_x, and suspended particulates from both existing and proposed plants (ERT, 1976). Although the wind flows in these figures are the most common winter patterns, the convergence of all plume centerlines is unlikely. Therefore, these estimates represent the worst case conditions.

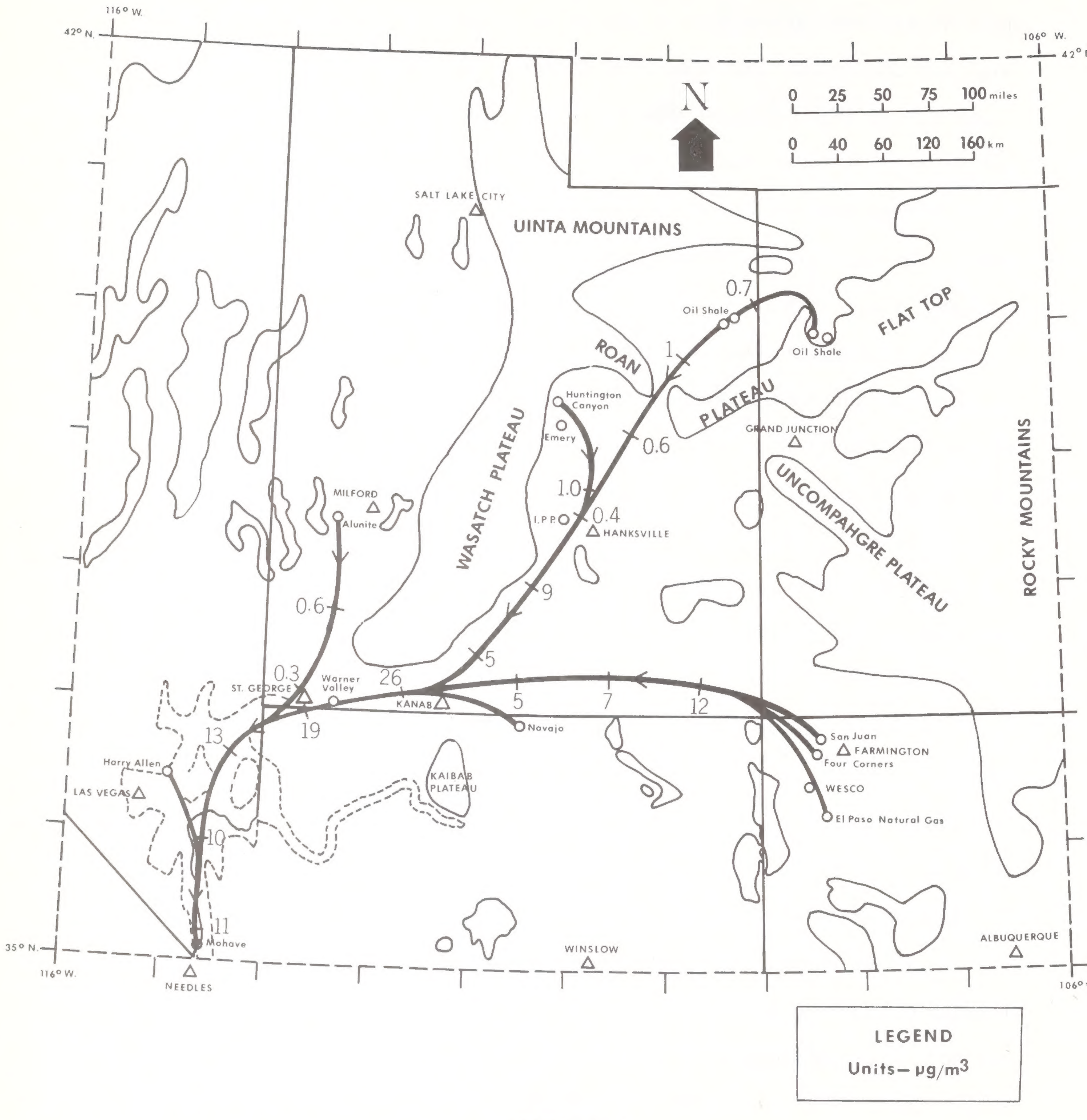


FIGURE 6-7

24-HOUR AVERAGE SO_2 CONCENTRATIONS ALONG AVERAGE WINTER TRAJECTORIES

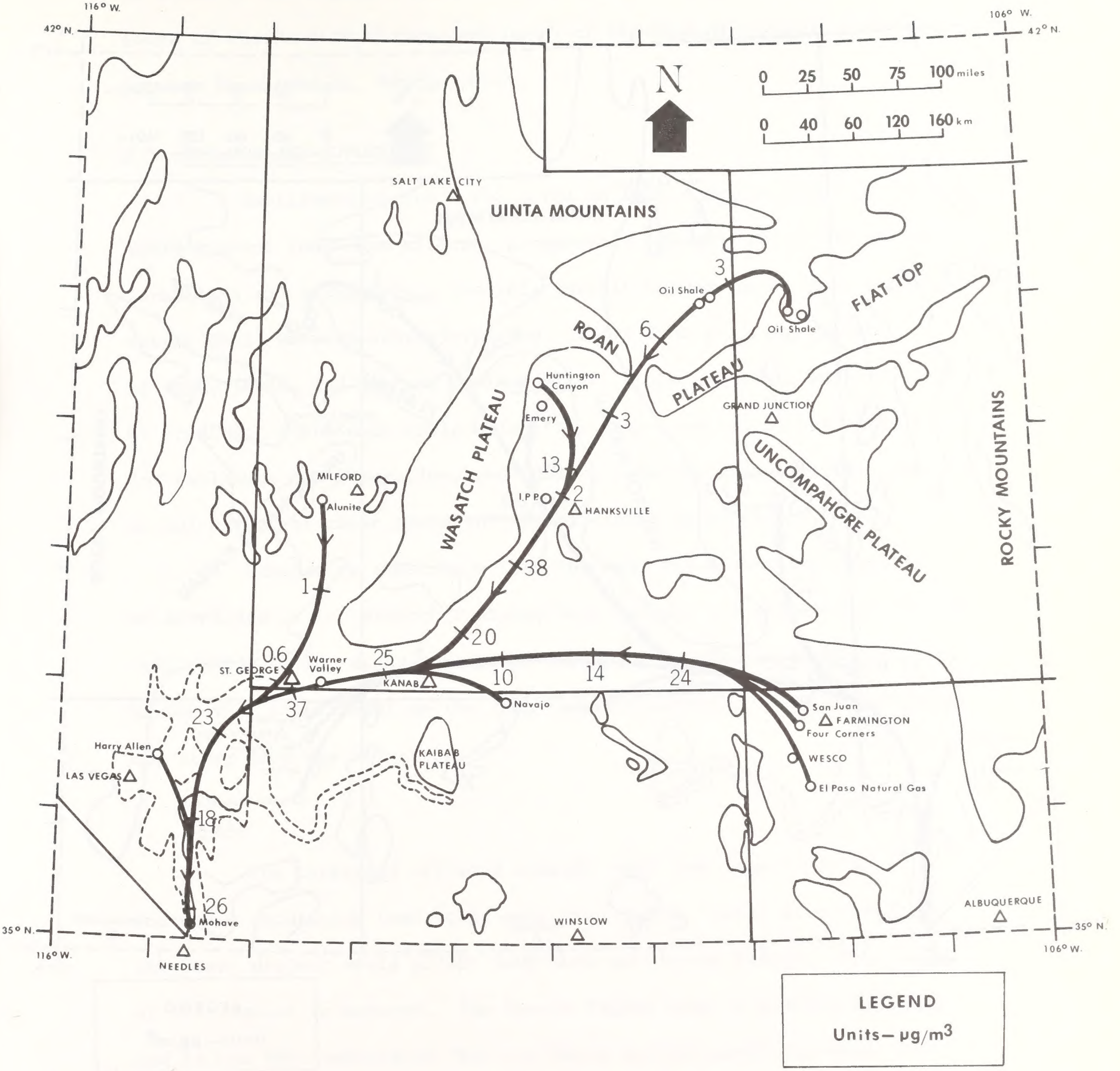


FIGURE 6-8

24-HOUR AVERAGE NO_x CONCENTRATIONS ALONG AVERAGE WINTER TRAJECTORIES

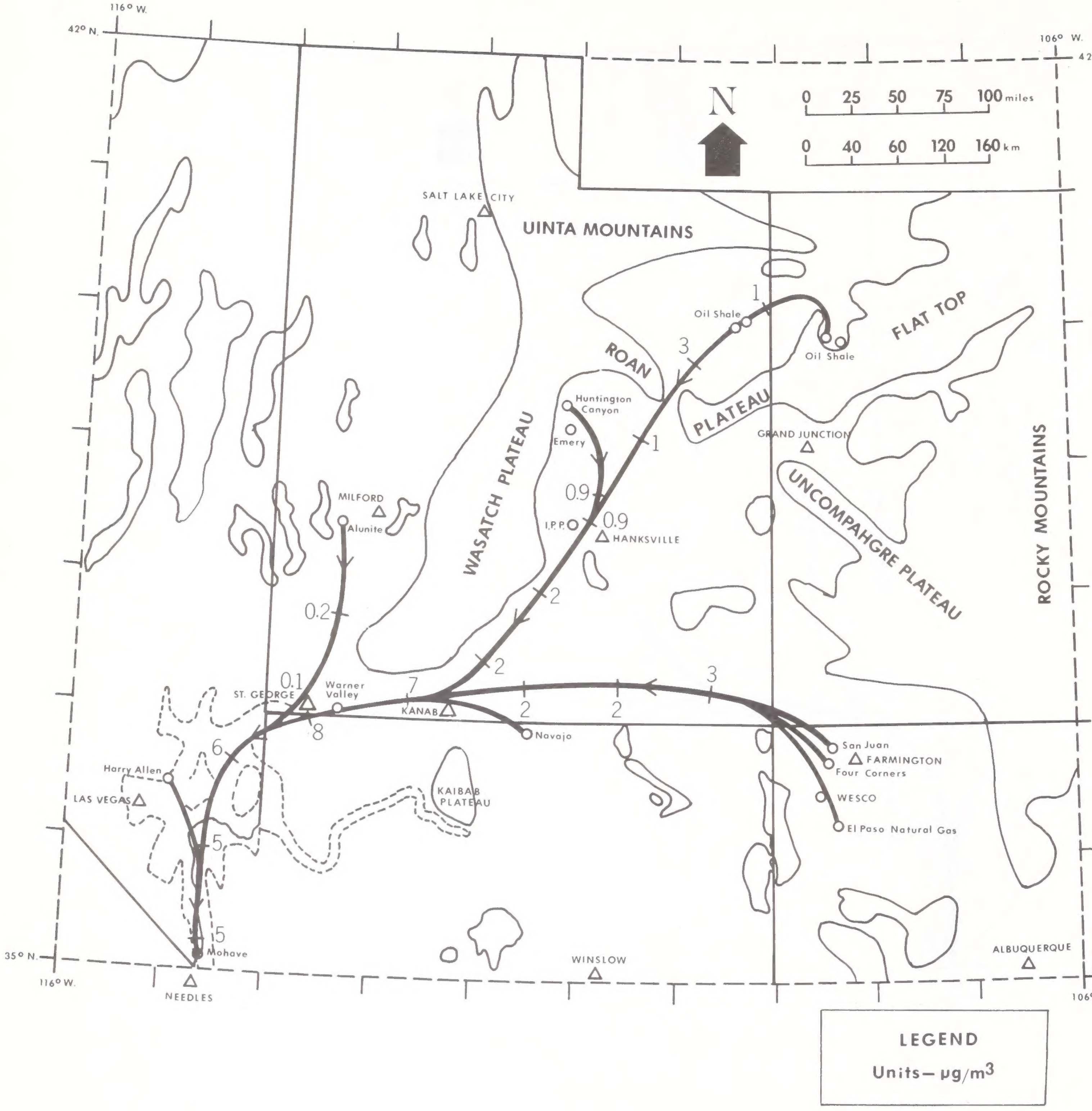


FIGURE 6-9

24-HOUR AVERAGE SUSPENDED PARTICULATE CONCENTRATIONS ALONG AVERAGE WINTER TRAJECTORIES

As shown in the figures, the most significant convergence would occur south of the Wasatch Plateau and north of the Kiabab Plateau, somewhere between Kanab and St. George, Utah.

D. GEOLOGY AND TOPOGRAPHY

Subsidence on the 4,658 acres on East Mountain above the mine would present long-term effects, permanently changing the local geologic formations and topography. The relationship between ground and surface waters could be permanently affected. Water from existing surface springs, lakes, and streams could be lost, while new water sources could be created. Subsidence could affect the long-term use of the surface for dwellings and recreation, and use by livestock and wildlife. The actual extent of these potential losses cannot be predicted.

Cumulative subsidence from the many mines that are expected to be developed in the Wasatch Plateau, Book Cliffs, and Kaiparowits Plateau coal fields in the decades to come, though of an unknown magnitude, may become very significant on the long-term productivity of water, grazing, and other land use resources.

E. SOILS

The increased off-road vehicle (ORV) use associated with increased population that would move into Castle Valley as a result of the Emery project would affect long-term soil productivity. The extent of this impact is unknown. The Castle Valley area is growing rapidly, and it has been calculated that the Emery project would increase ORV use by about 12 percent.

Long-term soil productivity would be lowered even after abandonment of the project, as 1,788 acres would be occupied by man-made structures

(such as access roads, towers, plant facilities, and haul roads). If not used for project purposes, this soil could be used to grow forage which would furnish food and cover for a number of different animals. Based on past experience, it is doubtful that these structures would be razed following the life span of the project, therefore foreclosing any options for future use of these soils.

F. VEGETATION

Short- and long-term vegetative productivity would be lowered if the project were approved. Long-term productivity would be affected by the permanent removal of vegetation for project facilities. Even though 351 acres temporarily disturbed could be reclaimed, the time required to return to current productive levels would vary considerably.

Long-term vegetative production on the 1,788 acres would be eliminated. This acreage would be occupied by facilities for the life of the project, and loss of this resource would eliminate wildlife and livestock grazing and agricultural production on that area.

Long-term vegetative productivity may be affected by power plant emissions. Deposits of SO_2, NO_x, phosphates, and trace elements may reduce vegetative density and cause changes in plant composition. There are insufficient data to determine the effect of these emissions, but the potential should be recognized.

G. WATER RESOURCES

The power plant operation would use an estimated 7,000 acre-feet of water per year from Millsite Reservoir. This requirement would preclude water withdrawal from Millsite for other purposes, such as,

municipal, industrial, recreational, agricultural, and wildlife.

The 7,000 acre-feet of water could support a population of 35,000 people per year (200 acre-feet per year per 1,000 people). The amount would also support about 1,785 acres of irrigated agricultural land or 1,720 head of domestic cattle, as well as large numbers of wildlife.

The mining operation would use an estimated 20 acre-feet of ground water per year for dust suppression in the mine, and about 15 acre-feet per year for shower water. Most of the shower water would be available for reuse.

The predicted population associated with the project would use 340 to 506 acre-feet of water from Cottonwood, Ferron, and Huntington creeks annually. The use of this water for domestic purposes would remove from 97 to 145 acres of irrigated land from production.

This proposed water useage would likely continue for an indefinite period, but would probably not have significant effects on the long-term productivity of the area. However, the combined water uses for this project and other energy-related projects in the Upper Colorado River Basin could significantly affect long-term productivity of the region. Projected water needs for all energy-related projects presently in progress, definitely planned, or projected, would total nearly 900,000 acre-feet per year by the year 2000 (USDI, Water for Energy Management Team, 1974). About 15 percent of this need (135,000 acre-feet) would be for projects currently in operation (including Navajo, Four Corners, San Juan, Naughton, Jim Bridger, and Huntington Canyon power plants, and an oil shale project in Colorado).

With proliferation of these energy-producing, water-using projects, the cumulative effect of this water use on long-term productivity could span many types of resources and uses (i.e., aquatic life, wildlife, agricultural, recreational).

The long-term productivity of the area above the Wilberg Mine could be reduced by the disturbance of underground aquifers during coal mining activities and subsequent subsidence in mined-out areas. Approximately 180 acre-feet per year of surface discharge from nine measured springs could be reduced or entirely eliminated for an indefinite period. The loss of this surface discharge would reduce quantities of water available for agricultural, domestic, and other local uses, and would diminish the quality of wildlife habitat and areas for livestock grazing.

H. WILDLIFE

Both short- and long-term wildlife productivity would be lowered by the project. Short-term pheasant productivity on the 800 acres of agricultural land retired from production would be lost. Deer and elk wintering areas and elk-calving and deer-fawning areas on private land along the Emery-Spanish Fork Canyon-Camp Williams transmission line could experience a short-term loss of deer and elk if construction were to occur during critical periods.

Loss of productivity on 900 acres of pheasant habitat that would be occupied by structural features at the generating complex site would result in a permanent, long-term impact. The permanent construction of facilities on the 900 acres would foreclose any future use of these areas for pheasant habitat.

The presence of the transmission lines in the Provo Bay and

Powell Slough areas would not foreclose the future option of designating those areas as critical habitat for the American peregrine falcon. If an attempt were made to restore this species to its historical eyries in the mountains east of Provo and Springville, it is likely that the marsh areas of Utah Lake would be considered as part of the critical habitat of the falcons (Porter, 1975).

I. CULTURAL AND PALEONTOLOGICAL RESOURCES

Should the proposed action be implemented, the short-term accumulation and dissemination of data would provide a data base for future investigations, and an immediate gain to what is presently only minimal scientific knowledge of the region. Preservation of the area for future observations would allow a greater amount of information to be obtained from salvage because of advances in technology. Uncontrolled loss of such values would occur from an increased population and associated recreational activities removing an unquantifiable percentage of values from future research potential.

J. SCENIC RESOURCES

The addition of industrial structures, such as the generating complex facilities and transmission lines, and an increase in urbanization would change the landscape character of the areas. These changes could be permanent and long-term if the facilities remain after the complex has served its usefulness.

If future events made it possible to dismantle the facilities, some scars caused by heavy equipment would remain for indefinite periods due to the exposure of subsoils that are incapable of supporting vegetation.

Even if reclamation were carried out, there would be scars - scars that would result in a long-term change of the landscape character.

The aesthetic values, as viewed by the public, would change, but such changes would not be permanent. The local populace would become accustomed to the change. Persons traveling through the area would realize a short-term loss of the quality visual experience. Yet, even though transmission lines could be removed after the Emery generating complex was abandoned, the fact remains that no major transmission line has ever been dismantled.

K. MINERALS

In the short term, use of low sulfur medium to medium-high British thermal unit (Btu) value coal reserves would help alleviate energy demands while meeting current air quality regulations. Coal mining would constitute partial recovery and utilization of a natural resource to assist the nation toward self-sufficiency in energy. Use of this resource would lessen the demand for other fossil fuels in short supply and would help provide additional lead time for research and development, which, in turn, would lead to long-term productivity of the more exotic energy sources, e.g., wind and solar energy.

The commitment and use of 4,800,000 tons of coal annually (2,400,000 mined, 2,400,000 left in place at 50 percent recovery) would involve a trade-off between fuel oil and coal. To produce 860 MW would require approximately 10,100,000 barrels of crude petroleum annually (USDI, Kaiparowits FES, 1976). At present, domestic crude petroleum is in short supply and use of coal would reduce the drain on that supply.

The use of coal under present technology and the mining of

coal under existing techniques would result in a reduction of potential long-term productivity. In the future, improved mining techniques could allow a greater rate of recovery than the presently projected 50 percent. Coal-fired electricity-generating plants are relatively inefficient with only 38 percent of the heat value being converted to electrical energy. Future technology, developed during the life span of the Emery project, could improve that efficiency.

The use of coal would promote conservation of the crude petroleum resource. However, the Emery plant would require consumption of fuel oil for burner ignition which would add to the long-term depletion of the oil source. The plant would use an estimated 2,900,000 barrels of fuel oil during the projected 35-year life span.

Mining coal for the proposed project would consume or otherwise permanently foreclose all other use of about 168,000,000 tons of the mineral.

The following energy available analysis shows the efficiency of actual energy consumed to energy delivered. Rationale for the preparation of the analysis is found in the Department of Interior publication, Energy Alternatives, A Comparative Analysis, 1975. Basic assumptions within the analysis are as follows:

One pound of Hiawatha coal contains 11,719 Btu, or 23.4 million Btu per ton. During the life of the project, 2.0 quadrillion (10^{15}) Btu would be mined (56.2 trillion [10^{12}] Btu mined each year). An addition 2.0 quadrillion (10^{15}) Btu's would be lost as unrecoverable coal (50 percent mining efficiency).

		Btu Energy Lost
Energy used in mining (4.79×10^9 Btu for each 10^{12} Btu mined)	=	9.58 trillion (10^{12})
Energy used in mine conveyor (2.48×10^8 Btu for each 10^{12} Btu shipped)	=	496.0 billion (10^9)
Benefaction of coal (breaking, sizing and washing) (4.29×10^9 Btu for each 10^{12} Btu processed)	=	8.6 trillion (10^{12})
Coal lost through waste ($25\% \times 2 \times 10^{15}$ Btu) (Btu shipped to power plant = 1.5×10^{15})	=	500.0 trillion (10^{12})
Energy used in transporting coal from mine to power plant (3.45×10^8 Btu for each 10^{12} Btu shipped)	=	696.0 billion (10^9)
Energy lost in power plant ($0.63 \times 1.5 \times 10^{15}$ Btu) (Based on 38 percent efficiency)	=	930.0 trillion (10^{12})
Energy lost in transmission line ($0.05 \times 5.7 \times 10^{14}$ Btu)	=	28.5 trillion (10^{12})
Total Energy Lost	=	3.5 quadrillion (10^{15})
Energy Delivered to Market ($0.95 \times 5.7 \times 10^{14}$ Btu)	=	545.0 trillion (10^{14})
Total System Efficiency	=	16 percent

It should be noted that the indicated efficiencies would be even lower if the energy expenditures in the analysis could be adequately evaluated and were other factors included (i.e.. transportation of workers to and from the coal mine and power plant, maintenance of transmission lines, and efficiency of electrical use in the market area). The proposed Emery power project is probably no more inefficient than other power projects being proposed. The use of 2 quadrillion Btu represents 0.04 percent of the total known reserves in the North American continent (USDI, 1976).

L. LAND USE

The commitment of land use for the complex development and operation would result in the elimination of approximately 1,600 acres of crop land and 1,200 acres of native forage. Reestablishment of the original land uses in the complex area and coal haul road is unlikely, and the area would probably not be restored to agricultural productivity after the life of the plant. It would, therefore, be considered a long-term commitment of land use. Restoration of the 800 acres of crop land outside the complex would likely occur, and could be considered a short-term commitment.

The subsidence effects above the Wilberg Mine must be considered as long-term. Complete restoration of the area to its original condition would be considered unreasonable and impractical. Use of the surface for cabin sites, sewer and water lines, recreational pursuits such as camping, hiking, ORV and hunting, and use by livestock and wildlife could be foreclosed in part or entirely. The extent of these losses is generally unknown, except that grazing losses could amount to as much beef as would be consumed by 550 persons annually.

The increased population resulting from the Emery project and other projects proposed in the primary zone of influence could create adverse short-term effects on recreational resources. The overuse and deterioration of various developed recreational areas could also occur. The loss of solitude and primitive conditions within some areas could also occur. People associated with the project would account for 12 percent of the total annual ORV use (11,000 visitor-days) in the area by 1981. The impacts of this use would be widely distributed, but concentrations

could be expected near the towns, on nearby National Forest lands, and on the San Rafael Swell.

As previously discussed, both Carbon and Emery counties have experienced population increases since 1970 as the result of renewed mining activity and power plant construction. The Emery project itself would increase the combined population (40,000) of these counties by approximately 12 percent (5,085). With the population increase, an additional 16,000 visitor days would be spent fishing, with an increased demand for 37,000 fish annually by 1981. The number of visitor days spent hunting deer would be expected to increase by 4,500 days, with an increased demand for a harvest of 370 deer annually. Also, the Manti elk herd would be subjected to an increase of 420 hunting days (3 percent) and an increased harvest of 14 elk (2 percent). Other wildlife species (including pheasant, dove, cottontail rabbit, and snowshoe hare) would also experience increases in harvest as numbers of hunters increase. With increases due to the Emery population (which represent approximately 12 percent of the total increase expected in the area) added to current hunting pressure, demands on wildlife would become very significant. The total cumulative impact on wildlife numbers cannot be predicted.

The building of energy-related projects is presently reducing acreage of wildlife habitat. The Emery project alone would remove 1,591 acres of wildlife habitat from Carbon and Emery counties. Total habitat acreage that would be lost, and numbers of animals affected from the combined effect of energy-related development in Castle Valley is not currently known.

Human harassment of wildlife by the business and leisure

activities associated with all the Emery-related population would also increase. As pointed out by the Utah Division of Wildlife Resources (UDWR) at Price, wildlife citations in the Carbon and Emery county area increased by 41 percent from 1973 (105 citations) to 1974 (148 citations). A majority (73 percent) of the citations involved actual wildlife losses (UDWR, 1976a). Because of harassment, wildlife would seek more favorable habitat elsewhere, which would bring about a cumulative degradation on surrounding habitat. The total habitat would thereby be reduced, affecting the total wildlife population. Total habitat acreage that would be changed and the related numbers of animals that would be lost cannot presently be estimated.

The removal of 20 homes and the foreclosure of the opportunity to develop 75 additional lots in Provo, due to construction of the transmission line, would be an immediate impact in that area. In the long term, removal of the homes and lack of further development along that section of the freeway would create a buffer zone between the freeway and the residential area. The long-term effect could enhance adjoining property values, and also increase low-quality wildlife habitat.

Power from this transmission line could be used for further long-term development of industry and housing in Utah County.

M. HUMAN RESOURCES

Development of the project would provide an estimated 849 new jobs at the mine and power plant. These jobs would be in addition to the 1,042 temporary construction jobs. Even though jobs would be available, obtaining employees with needed skills would require recruitment from outside areas. Some local people would benefit by having additional,

higher-paying job opportunities.

Residents would benefit in the long term through development of facilities and services (such as sewage and water treatment plants, schools, police, fire, and medical services). In the short term, these facilities and services would be overtaxed.

The project-related jobs would create some short-term economic gains to residents of Castle Valley communities. The present construction payroll is $10.8 million annually. The annual income in 1981 from the Emery project, including service-related employment would be $21.8 million. The generating complex would contribute at least $2.9 million to property taxes each year of the project life. No data are available to indicate whether there would be sufficient revenues to provide the long-term public services needed by the 5,085 people associated with the project.

The Emery generating complex would be only one part of the rapidly developing coal industry in the Carbon-Emery area. In the next 5 years, Carbon and Emery county mines are expected to produce more coal per year than the entire state produced in 1974. In the same time period (5 years), the population is expected to increase approximately 43 percent (from 28,000 to 40,000 persons). There is also the possibility of a rapid economic decline in the area after coal related projects are abandoned.

A change in life style would undoubtedly accompany development. The addition of a different group of people would mix existing values. In the long term, this mixing could lead to development of new values and life styles.

In the Provo area, the short-term impacts resulting from construction of the proposed transmission line would include: Relocation of approximately 70 persons, disruption of lifestyles, alteration of plans for a nursing home and a condominium development, and a real or imagined reduction of property values. In the long term, development would continue, property values would be equal to comparable property away from the transmission line, and lifestyles would be affected more by urbanization than by the presence of the proposed transmission line.

In the short term, the communities of Carbon and Emery counties would not have enough equipment to provide services for both the existing residents and the new population. The number of medical doctors would also appear to be inadequate. Medical appointments would continue to be difficult to obtain.

Police and fire services would be in short supply because of the higher demand by an increased population. Additional sanitation facilities would also be required.

In the short term, these facilities could be developed to the point of becoming sufficient. Yet, if the coal industry were to suffer a rapid economic downturn with the resultant population reduction, the expanded public facilities could become a tax burden to those remaining in the area.

N. HUMAN HEALTH AND SAFETY

The surface tension cracks caused by subsidence would remain as a long-term impact, a hazard to all human activity and productivity of the land.

Mining for the proposed project could cost 25 lives during the

planned 35-year production period. This is based on 0.4 lives lost per 1 million man hours worked (Gouse and Rubin, 1973).

CHAPTER 7

ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

7

CHAPTER 7

ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

A. INTRODUCTION

Irreversible is defined as incapable of being reversed; once initiated, the action would continue. Irretrievable is defined as irrecoverable; not retrievable; once used, not replaceable. Projects, where costs are such that removal of structures is unlikely, may be considered as irreversible. Actions committing future generations to continue a similar course may be considered as irretrievable.

B. AIR QUALITY

There would be some degree of air quality degradation and possibly some visibility effects. The change would not be irreversible, but would be irretrievable during the life of the project.

Air pollution modeling predictions indicate that plant emissions could approach the most restrictive ambient air quality standards by the following increments:

	Percent of Most Restrictive Standard	Concentration	Most Restrictive Standard
Sulfur dioxide	77	0.38 p/m	0.5 p/m (3 hr)
Nitrogen dioxide	11	0.006 p/m	0.05 p/m (annual)
Particulates	8	12 $\mu g/m^3$	150 $\mu g/m^3$

This condition would occur while burning worst-grade coal and under the most limiting meteorological conditions. Nitrogen dioxide (NO_2) and particulate concentrations would be below the levels detectable by the human senses. Concentrations would also be below levels which are

considered harmful to vegetation or livestock. The sulfur dioxide (SO_2) concentrations, during a limited number of days, could be detected by human taste.

C. GEOLOGY AND TOPOGRAPHY

Subsidence could occur above the Wilberg Mine, which would represent an irreversible change to geologic formations on some 4,658 acres.

D. SOILS

The loss of an unknown amount of soil on 2,500,000 to 3,500,000 acres in Castle Valley and on the San Rafael Swell, caused by a 12 percent increase in off-road vehicle (ORV) use, would be an irretrievable commitment of soil resources.

Soil productivity on 1,788 acres occupied by project facilities would be an irreversible commitment of the soil resource as long as project facilities occupied the acreage. In addition, soil productivity lost while the project facilities occupied the acreage would be irretrievable.

Of the 349 acres that would be disturbed during construction, soil productivity would be lost and erosion accelerated on 192 acres for 3 years. Lost production and accelerated erosion would continue for 10 years on 48 acres and 20 years on 109 acres. About 3,600 tons of soil would be lost in the San Rafael Drainage. The loss of soils through erosion and the loss of soil productivity until rehabilitation occurs represents an irretrievable commitment of the soil resource.

E. VEGETATION

Vegetative production loss on 1,788 acres permanently occupied

by project facilities would be an irreversible loss as long as the project facilities exist. In addition, lost vegetative production represents an irretrievable loss.

The vegetative cover and production could be restored within 2 to 3 years on the 192 acres that have a greater than 50 percent chance of normal range seeding operation, and within 10 years on 48 acres with a less than 50 percent chance of seeding success on moderate to low erosion-hazard soils. It is estimated that 20 years may be needed to revegetate the 109 acres disturbed on highly erosive soils with less than a 50 percent chance of range seeding success. The loss of vegetation productivity, until rehabilitation occurs, would be an irretrievable loss.

F. WATER RESOURCES

The increase of 320 tons per year of dissolved solids into the Colorado River would be irreversible in terms of water quality. The loss of water quality for the period of the project would also be irretrievable.

The possible disruption of ground water aquifers, resulting from coal mining activities and subsequent subsidence in mined-out areas, could result in the loss of over 180 acre-feet per year of surface discharge. The loss of this surface discharge would be an irretrievable commitment of water resources.

G. WILDLIFE

The increased population attributed to the Emery project would add to the pressure being exerted on wildlife (elk, deer, antelope, upland game birds, etc.) in terms of individual animal loss, habitat

loss, and harassment.

Presently, there are insufficient data to evaluate such impacts as they apply to the Emery project, but the impacts would continue through the lifetime of the project and would be considered as irreversible. Any loss of wildlife species would be irretrievable.

Pheasant habitat on 1,700 acres of agricultural land and riparian vegetation occupied by project facilities and retired from production would be lost. This acreage is capable of supporting approximately 240 cocks, 200 breeding hens, and 920 young. The loss of pheasant habitat and production for the period of the project would also be irreversible and irretrievable.

The loss of 620 acres of deer winter range as a result of the coal mine project facilities, noise, and human activity would be an irreversible loss. In addition, the loss of the deer winter range and the 8 deer that the range would support for the life of the project would be irretrievable.

Construction of the Emery-Spanish Fork Canyon-Camp Williams Transmission Line (and accompanying 40 miles of access road) across critical deer and elk winter ranges and through fawning and calving areas would cause irretrievable impacts. Disturbances from use of the 20 miles of access road left open would also be irreversible. The number of animals and acreage of habitat that would be affected are not known.

H. CULTURAL AND PALEONTOLOGICAL RESOURCES

Loss of cultural and paleontological sites would be an irretrievable commitment of resources. Even though sites may be salvaged, current limitations in methods of recovery and in analytical techniques would

subject the cultural and paleontological investigations to an irretrievable loss of information. Research methods currently being employed destroy the context as the cultural or paleontological article is removed. This method (salvage) limits future opportunities. Increased recreational activities would subject this resource to an unquantifiable loss that would be irretrievable.

I. SCENIC RESOURCES

Implementation of the proposed project would irreversibly and irretrievably commit the area to a more intensive industrial use during the life of the project. The essentially natural landscape would be altered by the intrusion of roads, buildings, and transmission lines. These alterations would irreversibly change the quality of the scenic resources. If buildings and linear facilities were not removed after the useful life of the plant, the impact would remain. Some residual evidence of the generating complex and support facilities would be present even though the complex and transmission lines were removed. Some scarring would remain for years at all parts of the project but eventually the land would return to a nearly natural landscape character.

The facilities would be visible for about 6 minutes while traveling at normal highway speeds along Highway 10. Approximately 130 miles of transmission line would be visible from highways. There would be 16 highway crossings. Transmission lines could be removed upon abandonment of the generating complex, however, major transmission lines are seldom removed. Consequently, the impact to visual resources would be considered as irreversible.

J. MINERALS

The major firm commitments of minerals to the Emery project are:

1. Steel - 27,375 tons
2. Aluminum - 11,285,000 pounds
3. Pit-run structural fill - 2,400,000 cubic yards
4. Concrete - 116,000 cubic yards
5. Sand and gravel (bedding) - 10,000 cubic yards
6. Cuts and fills - 825,000 cubic yards

During the 35-year economic lifetime of the plant, the following would be used:

1. Coal: Burned - 84,000,000 tons
   Unrecoverable (left in place) - 84,000,000 tons
2. Diesel fuel - 18,095,000 gallons (coal transportation)
3. Fuel oil (Number 2 diesel) - 44,200,000 gallons (generator start-up)
4. Gasoline - 5,460,000 gallons (commuting)
5. Electricity - 61,200,000 kilowatt hours (mining)
   - 9,320,000 kilowatt hours (plant)

Should the plant be operated beyond the 35-year economic life, each of the quantities above would increase by 1/35th for each year of additional operation.

K. LAND USE

Agricultural production on 800 acres of crop land inside the complex and 30 acres of crop land in the coal haul road right-of-way would probably not be restored by the applicant. The loss of these resources would be considered irretrievable.

Recreational use would be excluded from the generating complex and coal source area. Other recreational activities would be altered or

reduced in the power line corridors, the coal transportation routes, and in the water pipe line right-of-way. The increased recreational use on some sites and areas may irretrievably affect these resources. Removal of 20 homes and foreclosure of the opportunity to develop 75 lots in the Provo area would be an irretrievable commitment of land use.

The potential subsidence of 4,658 acres of land could impair livestock grazing and outdoor recreation.

L. HUMAN RESOURCES

The community and government would be committed to a new life style in Carbon and Emery counties, which could attract future growth.

The commitment of at least 35 years of time for 849 plant operators and miners (29,715 man-years) would be irretrievable. A total of 2,426 man-years would be spent in the construction of the plant.

A commitment to use land in a specific way encourages the development of certain social-spatial patterns. These patterns, in turn, would require additional lands, with the populace committed to an expanding social system that would be practically irreversible. These social-spatial patterns result in irreversible commitment to a new lifestyle for residents of Castle Valley.

In the Provo area, relocation of approximately 70 persons and the possible disruption in their lifestyle would be an irreversible commitment. Expenses associated with relocation would be irretrievable. The uncorrectable decrease in the quality of radio and television reception due to the transmission lines would be irretrievable.

M. HUMAN HEALTH AND SAFETY

The construction and operation of the plant and mine could

result in some fatalities, and certainly many injuries. Traveling to and from the generating complex and the mine would increase traffic and could also lead to accidents. Fractures caused by subsidence would be a irreversible hazard to human activity. Data indicate that one death would occur for every 4 million man-hours worked in underground coal mines. Thus, one fatality could be expected for every 2 years of mine operation.

Vehicle-tower collisions, falling towers, or electrocution would cause irretrievable loss of human life. However, the numbers of lives that could be lost cannot be predicted.

N. MARKET AREA

As a result of increased electrical energy, some irreversible changes would result in the market areas. Adverse changes in population, income, and housing are presently occurring. The incremental change which would be caused by the proposed project cannot be identified.

CHAPTER 8

ALTERNATIVES TO THE PROPOSED ACTION

8

CHAPTER 8

ALTERNATIVES TO THE PROPOSED ACTION

A. INTRODUCTION

The Emery project as proposed by Utah Power and Light Company (UP&L) is described in Chapter 1 and the impacts that would result from the project are analyzed in Chapters 3 through 7.

This chapter presents those environmental impacts that would result from alternative proposals. Only environmental elements that would be affected in a significantly different manner than those at the Emery site will be discussed here. Special emphasis will be given to alternatives resulting in a reduction of impacts which for the Emery proposal were classified as unavoidable.

Five alternative sites are described, and such impacts that would be significantly different from those at the Emery site are analyzed. Impacts resulting from other alternatives i.e., plant design and operating methods, coal and water sources, mining techniques; water, coal, electrical transport systems are also discussed.

The impacts resulting from alternative sources of energy are described next. Finally, energy conservation, and the alternatives of delay, and no action are dealt with.

The amount of coal that would be used at the alternative sites would be nearly the same amount as planned for the Emery Site. The market area would also be the same for all alternatives as for the project as proposed. Consequently, there will be no discussion on minerals or market area in this chapter.

Portions of the Emery project have been under construction on

nonfederal land since March, 1975 and as of the middle of December, 1976 it was 35 to 40 percent complete. This situation makes the alternative section unique in that construction was initiated prior to completion of the environmental statement.

A major concern is the control of sulfur dioxide (SO_2) emissions. On December 12, 1973, UP&L was granted a construction permit by the Utah Division of Environmental Health. The approved design included a commitment to remove 80 percent of all SO_2. However, the required SO_2 control commitment was later rescinded by State of Utah authority (Appendix I-4). Consequently, the description of the project as submitted to the Bureau of Land Management (BLM) by the Company contained no provision for SO_2 control. The analyses of impacts, therefore, in Chapters 3 through 7 are based on no SO_2 control. Flue gas desulfurization (FGD) is discussed in this chapter as an alternative to no control.

B. ALTERNATIVE SITES FOR COAL-FIRED, STEAM-ELECTRIC GENERATING PLANTS

1. General

The following 23 sites were examined by the applicant and BLM for possible use as alternatives to the Emery site.

UTAH

Site	General Location
Cedar Valley	West side of Utah lake, in Utah County
Garfield (East and West)	About 7 miles south of Escalante, in Garfield County
Greenriver	Fifty-seven miles southeast of Price in Emery County

Huntington	At the current Huntington generating plant site, in Emery County
Kearns	Salt Lake City area
Lincoln Point	At the north point of West Mountain at the south end of Utah Lake in Utah County
Little Mountain	About 12 miles west of Ogden, in Weber County
Nephi	Eighty five miles south of Salt Lake City, in Juab County
North Emery (West)	About 3 miles west of the proposed Emery site
Orem	Provo area
Scofield	Between Price and Provo, in Carbon County
Sevier Valley	About 7 miles north of Salina, near U.S. Highway 89, on the Sevier-Sanpete Co. line
South Emery	Near Emery town in Emery County
Wellington	About 6 miles southeast of Price, in Carbon County
Woodruff Narrows	By the town of Woodruff, in Rich County
Woodside	Approximately 40 miles southeast of Price in Emery County

IDAHO

Site	General Location
American Falls	Reservoir near the town of Aberdeen in Power County
Bear Lake	Northeast side of Bear Lake, 15 miles south of Montiplier in Bear Lake County
Pegram	About 7 miles east of the northeast corner of Bear Lake, in Bear Lake County

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Bear Lake	Northeast side of Bear Lake, 15 miles south of Montiplier in Bear Lake County
Pegram	About 7 miles east of the northeast corner of Bear Lake, in Bear Lake County

Soda Springs	Near the town of Soda Springs, in Caribou County

WYOMING

Site	General Location
Gillette	Near the town of Gillette, in Campbell County
Naughton	Located about 5 miles south of Kemmerer in Lincoln County
Potter Mountain	About 30 miles east of Flaming Gorge, 10 miles north of Utah border, in Sweetwater County

Fourteen of the sites were considered not readily available or technically feasible. In an initial analysis of fuel availability, four sites were eliminated - Wellington, Woodside, Greenriver, and Soda Springs. In addition a fifth site at Woodruff Narrows not only lacked a readily available fuel source but had poor access and adverse air quality conditions during winter months.

Sites at Orem and Kearns were rejected as they are located within the Wasatch Front Air Quality Maintenance Area (AQMA) and very near to high population centers. Two additional sites located in Emery County - the South Emery was not available because of lack of adequate water supplies and North Emery (west) as it was too close to elevated terrain and would likely exceed air quality standards. Likewise Pegram was located too close to elevated terrain. Scofield and Gillette had severe socioeconomic problems. Potter Mountain is inaccessible and is remote from a reliable water source. Also in the initial analysis remoteness of a fuel source and difficulty in obtaining a reliable source of water eliminated the Nephi site.

Of the 9 remaining sites proposed by the participants, two

nuclear plant sites, at American Falls, Idaho, and Bear Lake, Idaho, were not considered, the latter because of potential seismic instability. The Lincoln Point proposal on the south shore of Utah Lake was eliminated because of air quality considerations. Consideration of the Naughton site near Kemmerer, Wyoming, was eliminated from analysis because that site has already become a firm proposal for another power plant.

The remaining five sites are analyzed in this chapter; two (Cedar Valley and Little Mountain), though technically feasible, were eliminated from consideration because of air quality limitations in Salt Lake and Utah counties. These two alternatives will be discussed briefly. Of the remaining three sites one (Garfield East and West) is located near Escalante, Utah, and one at Salina, Utah, and one at Huntington, Utah (Figure 8-1).

Each of the alternative plants would consist of two 430-MW units requiring approximately the same equipment and manpower and the same inputs of coal and water as the Emery proposal. Each would produce approximately the same amounts of waste water, stack emissions, ash, and other solid wastes. Minor differences would be caused by the quality of coal available at each site and the differences in the quality of water which could affect cooling water make-up rates. Each of the alternatives would require a somewhat different arrangement of facilities to conform to terrain features. At one site, generating units would be added to existing facilities. At the other four sites, completely new facilities would be constructed.

Work has been completed indicating the engineering soundness of each alternative, however, detailed design work has not been done. For the Huntington alternative, some design work has been completed

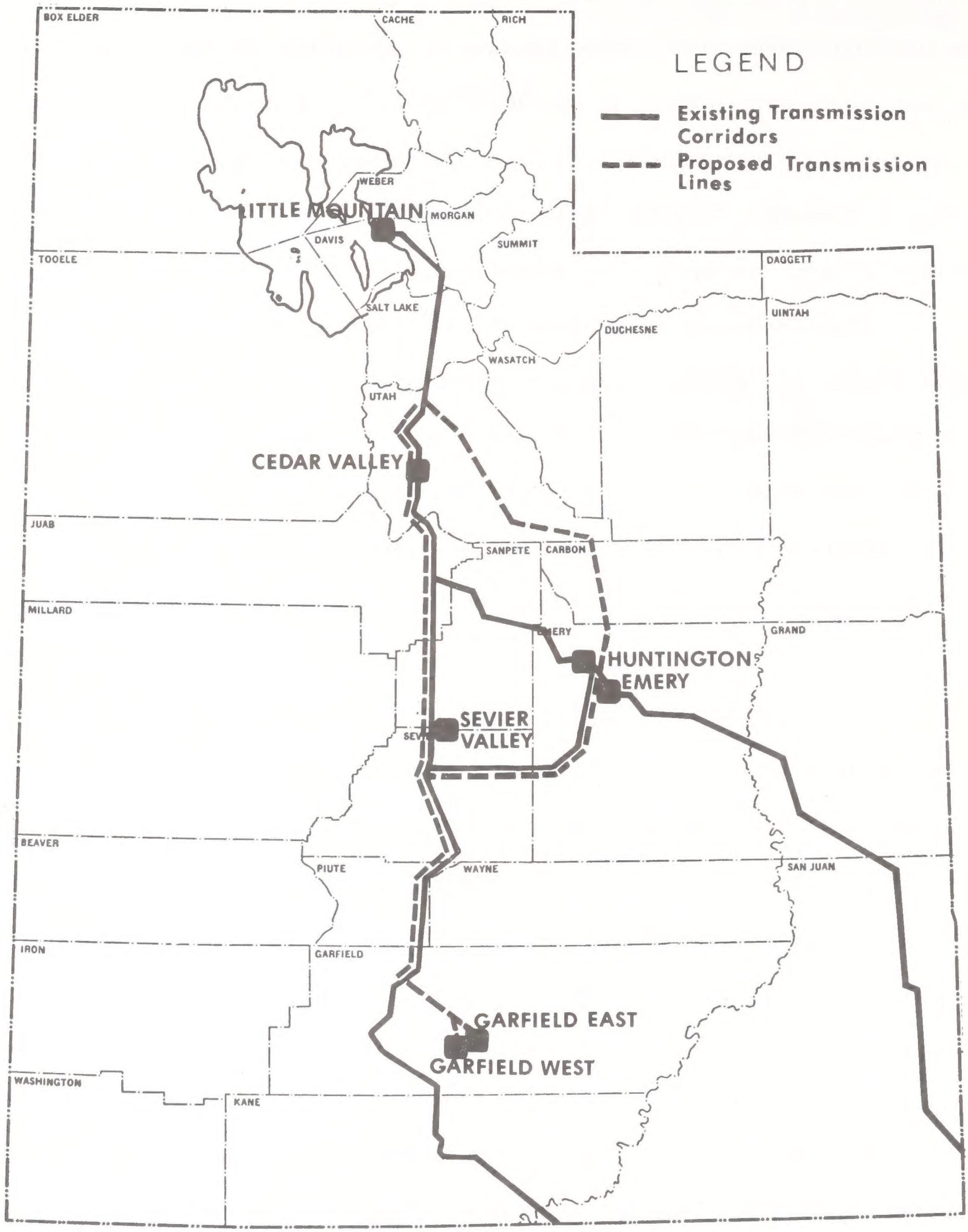

FIGURE 8-1

LOCATION OF PROPOSED EMERY SITE AND ALTERNATIVE GENERATING SITES AND ASSOCIATED TRANSMISSION LINES

should additional units be needed in the future. Each alternative would require two new parallel transmission lines as follows:

Alternative Site	New Corridor (mi)
Garfield (East and West)	30
Sevier Valley	7
Huntington 3 & 4	
Spanish Fork Canyon	[a]87
Salina Canyon	[b]--

[a]Total length of corridor would be 118 miles (87 new and 31 existing).

[b]The 73-mile Salina Canyon corridor has already been used for one transmission line.

The communications system at the alternative sites would be microwave in all instances, using existing facilities where possible.

At each of the alternative sites, the Company would construct a generating complex that would meet all applicable state and federal point source and ambient air quality standards. Therefore, no mitigating measures will be given for air quality in this chapter.

Regardless of which field is involved, the 2,400,000 tons of coal that would be used represents no more than 2 percent of the reserve available from the field being mined.

2. The Garfield Sites

Two sites located near the center of Garfield County, Utah - Garfield West and Garfield East - have been considered. Plant descriptions have been kept separate for the two sites, because locations, rights-of-

way, and amounts of lands used are different for the two sites. Discussions of environmental considerations, as well as federal and state actions required, have been differentiated betweeen the two sites only when environments are dissimilar or when the impacts would be markedly different.

a. Description - Garfield West

The Garfield West alternative site would be located in sections 25 and 26, T. 36 S., R. 2 E., Garfield County, Utah (lat. 37° 38.5' N; long. 111° 38.5' W), in Little Valley at the confluence of Little Valley Wash and Alvey Wash, about 9 miles south-southwest of Escalante. The elevation of the site is 6,000 feet mean sea level (MSL). The site, surrounded by peaks in the 7,000 to 7,500 foot range, is largely hidden from casual view (Figure 8-2). A detailed design has not been made for the Garfield West site, but it is anticipated that the same elements as the Emery site would be rearranged in a somewhat different configuration.

A gravel road exists from Escalante to the site. This road would require upgrading for all-weather access. The nearest railroad is located at Marysvale, Utah, about 100 miles northwest of the site.

The Garfield West site is underlain with coal owned by UP&L. The UP&L Twitchell Mine, about 3 miles north along Alvey Wash, would probably be reopened, or a new portal to the mine would be opened immediately southeast of the plant site. Coal would be delivered to the plant by conveyor.

Two sources of water have been proposed. The first would involve a 1,200 surface acre reservoir on the Escalante River, with a dam located about 1.5 miles above the mouths of Harris Wash and Silver Falls Creek, in SE 1/4 section 15, T. 36 S, R. 6 E, Garfield County,

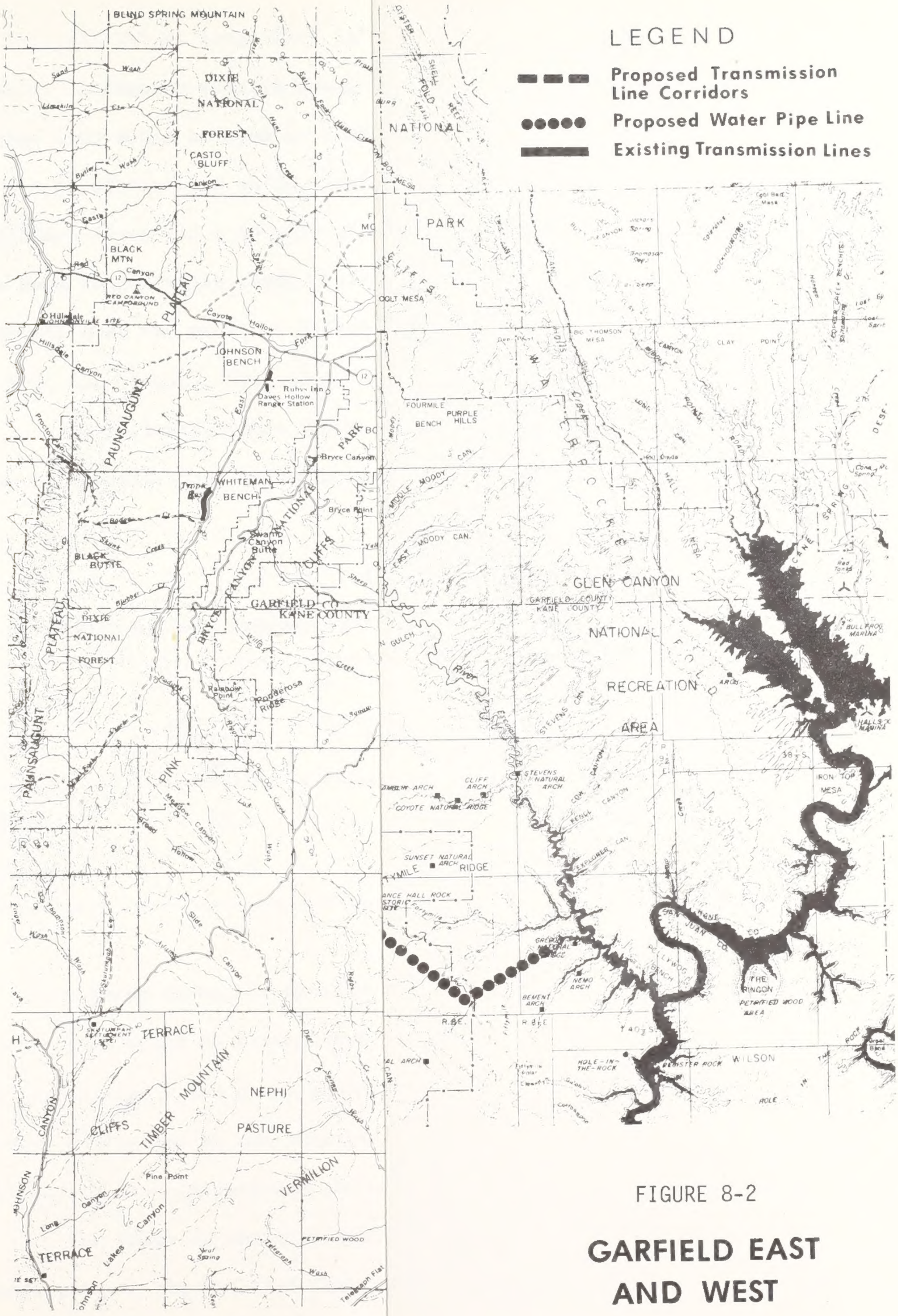

FIGURE 8-2

GARFIELD EAST AND WEST

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a. Description - Garfield West

The Garfield West alternative site would be located in sections 25 and 26, T. 36 S., R. 2 E., Garfield County, Utah (lat. 37° 38.5' N; long. 111° 38.5' W), in Little Valley at the confluence of Little Valley Wash and Alvey Wash, about 9 miles south-southwest of Escalante. The elevation of the site is 6,000 feet mean sea level (MSL). The site, surrounded by peaks in the 7,000 to 7,500 foot range, is largely hidden from casual view (Figure 8-2). A detailed design has not been made for the Garfield West site, but it is anticipated that the same elements as the Emery site would be rearranged in a somewhat different configuration.

A gravel road exists from Escalante to the site. This road would require upgrading for all-weather access. The nearest railroad is located at Marysvale, Utah, about 100 miles northwest of the site.

The Garfield West site is underlain with coal owned by UP&L. The UP&L Twitchell Mine, about 3 miles north along Alvey Wash, would probably be reopened, or a new portal to the mine would be opened immediately southeast of the plant site. Coal would be delivered to the plant by conveyor.

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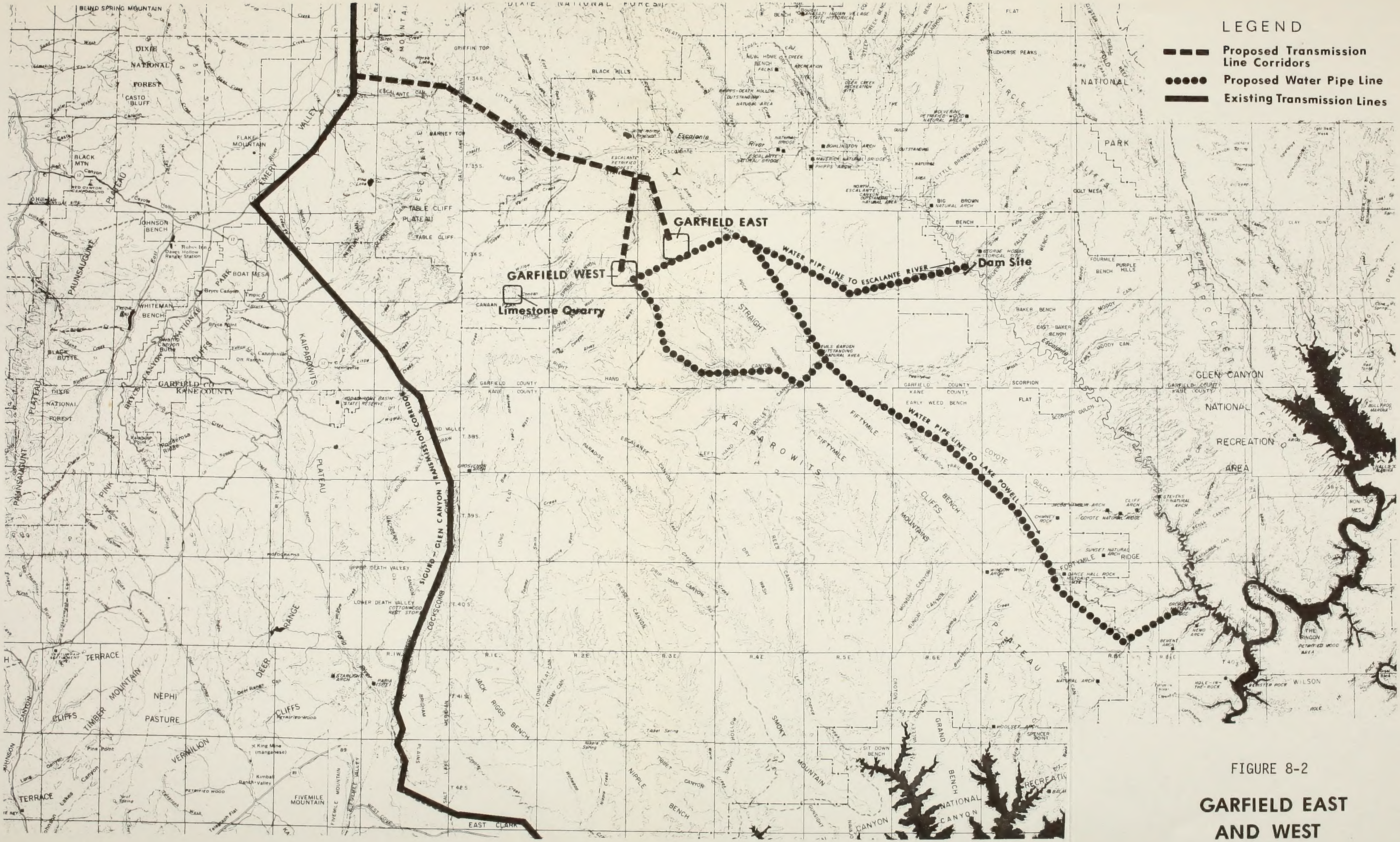


FIGURE 8-2

GARFIELD EAST AND WEST

Utah (lat. 37° 39' N; long. 111° 13' W), 25 miles east of the Garfield West site. A pumping station would be constructed at the dam. A 25-mile pipe line would be used to convey the water to the site.

An alternative would require taking water from Lake Powell or the Colorado River via a 49-mile pipe line along the base of the Straight Cliffs down to Fiftymile Creek, with an intake and pumping station at Lake Powell near the mouth of Fiftymile Creek, near the center of T. 40 S, R. 9 E, Kane County, Utah (lat. 37° 20' N; long. 110° 56' W).

The following table shows the ownership of the land crossed by the two alternative pipe lines to the Garfield West site:

TABLE 8-1

Ownership of Land Crossed by Pipe Line Alternatives to Garfield West

Pipe Line	Area Crossed (mi)				
	Federal (NRL)	Federal (NRA)	State	Private	Total
Escalante Reservoir	21.5	1.0	2.0	0.5	25.0
Lake Powell	38.0	5.5	5.0	0.5	49.0

A three conductor 69-kilovolt (kV) power line and a 10-foot wide dirt road would be constructed to whichever of the two sources of water is selected. The power would be needed at the pumping station at the water source and at the booster station. The road would be used for conducting routine inspections and maintenance.

The lands of the Glen Canyon National Recreation Area (NRA) (administered by the National Park Service [NPS]) to be crossed by both

water supply lines have been determined to be suitable for potential wilderness area classification (USDI, NPS, 1975). An Environmental Statement presently being prepared by the National Park Service to evaluate the wilderness proposal is scheduled for completion in January, 1977. Congress must enact legislation to classify the lands as wilderness. Lands will be managed as wilderness until the final determination has been made by Congress.

Limestone to operate the SO_2 scrubbers would be available from a quarry atop Canaan Peak, approximately 10 miles west. Low-silica limestone of the Flagstaff formation forms a cap-rock over much of the Wasatch Plateau and this limestone could be developed at many sites north and west of the plant site. An alternative quarry site could be atop Table Cliff, north of Canaan Peak, or in Johns Valley, about 7 miles north of Bryce Canyon National Park. The Johns Valley quarry location would require a haul of 30 miles over State Highway 52 through Bryce Canyon National Park to the site. Limestone could also be made available from various commercial sources, but at longer haul distances.

Most of the estimated 1,042 construction workers, 203 operators, and 600 miners would probably live in Escalante, with smaller numbers in Henrieville or Boulder.

Both the generating complex and mine would be considered no-water discharge units. Solid wastes, including ash and sludge, would be land-filled at the site. Waste water would be pumped into an evaporation pond.

Transmission lines from the site would extend north through Alvey Wash up Main Canyon west of Escalante, thence northwest down Horse Canyon to join an existing corridor in Johns Valley, a total distance of

about 30 miles. From Johns Valley, the new 345-kV line would pass northwest paralleling the existing Page-Sigurd line to the Sigurd substation, a distance of about 69 miles.

Table 8-2 shows the ownership of the lands over which the transmission lines would cross:

TABLE 8-2

Ownership of Land Crossed by Transmission Lines (Garfield West)

Area Crossed (mi)				
Federal (NRL)	Federal (USFS)	State	Private	Total
11.5	13	3.5	2	30

The Sigurd-Camp Williams 345-kV line proposed for the Emery site would be a part of this alternative.

b. Description - Garfield East

The Garfield East alternative site would be located in sections 15 and 16, T. 36 S, R. 3 E, Garfield County, Utah (lat. 37° 40' N, long. 111° 33' W), at the east base of the 6,800-foot Escalante Rim, about 7 miles southeast of Escalante. The site elevation is about 5,700 feet. The Garfield East site is shown on Figure 8-2.

A detailed design has not been made for the Garfield East site, but it is anticipated that the same elements as at Emery would be rearranged in a somewhat different configuration.

A gravel road from Escalante to the site would require upgrading

to permit all-weather access by heavy traffic. There is no nearby railroad.

There are coal outcrops along the Escalante Rim (part of the Straight Cliffs formation) to the west of the site. Underground mining would be conducted and the coal would be delivered to the plant by means of a conveyor belt 2.25 miles in length.

The same sources of water have been proposed for the Garfield East site as for the Garfield West site. However, pipe line lengths would be different. Table 8-3 shows the land areas crossed by the alternative pipe line to the East site.

TABLE 8-3

Ownership of Land Crossed by Pipe Line Alternatives to Garfield East

Pipe Line	Area Crossed (mi)				
	Federal (NRL)	Federal (NRA)	State	Private	Total
Escalante Res.	16.5	1.0	2.0	0.5	20.0
Lake Powell	37.5	5.5	5.0	0	48.0

The sources of limestone to operate the SO_2 scrubbers would be the same as those cited for the Garfield West site.

Most of the construction, mining, and operating personnel would live in Escalante, 7 miles from the site, with smaller numbers in Henrieville or Boulder.

There would be no discharge of waste waters from the generating

complex or the coal mine. Solid wastes, including ash, would be landfilled at the generating complex site. Waste water could be placed into an evaporation pond.

Transmission lines would pass northwestward to enter Main Canyon west of Escalante, thence to an existing corridor in Johns Valley, a distance of about 29 miles. From Johns Valley, the new 345-kV line would pass northwestward through the existing Page-Sigurd corridor to the Sigurd substation, a distance of about 69 miles.

The Sigurd-Camp Williams 345-kV line proposed for the Emery site would be a part of this alternative.

c. Federal and State Authorizing Actions

(1) The Bureau of Land Management

The BLM would:

(a) Approve State Indemnity Lieu Selection to the State of Utah, for approximately 2,000 acres of national resource lands at the West site or 1,000 acres of national resource lands at the East site (Revised Statutes [R.S.] 2275, 2276, as amended; 43 United States Code [U.S.C.] 851; 43 code of federal regulations [CFR], Part 2620).

(b) Grant a 130 foot right-of-way for the transmission line to cross approximately 11.5 miles of national resource lands (Act of March 4, 1911; 36 Stat. 1253; 43 U.S.C. 961; as amended; 43 CFR, Part 2850).

(c) Grant a 25-foot wide right-of-way, in cooperation with the Park Service, including a dirt maintenance road, for a water pipe line, from the proposed Escalante Reservoir to the West site to cross approximately 22.5 miles of national resource lands and national recreation area; or

from Lake Powell to the West site to cross approximately 43.5 miles of national resource lands and national recreation area.

(d) Or as an alternative to (c) above; grant a 25-foot wide right-of way for a water pipe line, including a dirt maintenance road, from the proposed Escalante Reservoir to the East site to cross approximately 17.5 miles of national resource lands and national recreation area; or from Lake Powell to the East site to cross approximately 43 miles of national resource lands and national recreation area.

(2) The U.S. Forest Service

The U.S. Forest Service would grant a 130-foot special use permit for the transmission line to cross approximately 13 miles of Dixie National Forest Lands (The Organic Act of June 4, 1897).

(3) The National Park Service

The National Park Service would issue a special use permit for the construction of the Escalante Dam and Reservoir (Public Law [P.L.] 92-593, October 27, 1972).

Grant a 25-foot wide right-of-way, in cooperation with the BLM including a dirt maintenance road, for a water pipe line, from the proposed Escalante Reservoir to the west site to cross approximately 22.5 miles of national resource lands and national recreation area; or from Lake Powell to the west site.

(4) The Corps of Engineers

The Corps of Engineers would grant permission to construct a dam on the Escalante River or a water intake structure as required at

Lake Powell (30 Stat. 1151; 33 U.S.C. 403).

(5) The State of Utah

The State of Utah would:

(a) Acquire natural resource lands by state selection to make lands available for the plant site (Utah Enabling Act of July 16, 1894, as amended [28 Stat. 107; 43 U.S.C. 851-853; Utah Code Annotated 1953, as amended, Title 65.]).

(b) Grant a 130-foot right-of-way for the transmission line to cross approximately 3.5 miles of state land (Utah Code Annotated 1953, as amended 65-2-1).

(c) Grant a 25-foot right-of-way for the water pipe line from the proposed Escalante Reservoir to either the West or East site across approximately 2 miles of state land (Utah Code Annotated 1953, as amended 65-2-1).

(d) Or as an alternate to (c) above, grant a 25-foot right-of-way for the water pipe line from Lake Powell to either the West or East site across approximately 5 miles of state land (Utah Code Annotated [U.C.A.] 1953, as amended 65-2-1).

d. Interrelationship With Other Projects and Proposals

Three existing plants and one proposed coal-fired generating plant would be related to the Garfield alternatives. Table 8-4 shows the status of these projects and the possible relationship with the alternatives.

TABLE 8-4

Coal-Fired Generating Plants Interrelated With Garfield Alternatives

Development	Percent Owned	Location	Size (units)(MW)	Date of Beginning Operation	Possible Interrelationships
San Juan		About 13 mi N of Four Corners			
Public Service Co. of NM	50	power plant	1 - 330	1973	Air Quality
Tucson Gas & Electric	50		1 - 330	1975	
Four Corners		NW Corner of New Mexico, near	1 - 176	1963	Air Quality
Arizona Public Service Co.	15	Shiprock	1 - 177	1963	
El Paso Natural Gas	7		1 - 220	1964	
Public Service Co. of NM	13		1 - 800	1969	
Salt River Project	10		1 - 800	1970	
Southern California Edison	48				
Tucson Gas & Electric	7				
IPP (Intermountain Power Project)		10 mi N of Caineville, Utah	1 - 750	1981	Air Quality
Intermountain Consumers		(proposed)	1 - 750	1982	
Power Association	15		1 - 750	1983	
City of Anaheim, CA	15		1 - 750	1984	
City of Burbank, CA	2.5				
City of Glendale, CA	2.5				
City of Los Angeles, CA	50				
City of Pasadena, CA	5				
City of Riverside, CA	10				
Navajo		4 mi E of Page, Arizona	1 - 750	1974	Air Quality
Salt River Project	21.7		1 - 750	1975	
Los Angeles Dept. of Water &			1 - 750	1976	
Power	21.2				
Arizona Public Service Co	14.0				
Nevada Power Co	11.3				
Tucson Gas & Electric	7.5				
Bureau of Reclamation (US)	24.3				

e. Existing Environment

(1) Climate and Air Quality

The meteorological characteristics of both Garfield sites are similar. Potential diffusion problems exist due to higher terrain surrounding the sites (VTN, 1975a). Canaan Peak, 10 miles west-southwest of the site, rises 3,000 to 4,000 feet above site elevation.

Based on 5 years of weather records, the number of stagnation episodes is slightly greater at the Garfield sites (49 episodes) than at Emery (40 episodes) with mixing heights below 1,600 feet and winds less than 14 miles per hour persisting for 2 days or longer. Supporting air quality monitoring data in the Garfield area are unavailable for assessment. Air quality in the area would be expected to be good based on the lack of pollution sources in the immediate area and the remoteness of the sites to industrialization and other human activity. Particulate levels may be high, especially during wind storms, with soil dust comprising most of the particulates (USDI, Kaiparowits EIS, 1976).

Legislation was considered and not passed in the 94th Congress to amend the Clean Air Act regarding the Prevention of Significant Deterioration Regulation (PSDR). Under the present PSDR, 40 CFR 52, National Parks and certain other federal lands are designated as Class II areas. Class II areas are defined as those in which air quality deterioration that would normally accompany moderate, well-planned growth would not be considered significant. The proposed legislation would have reclassified these areas to Class I. Class I applies to those areas in which practically any change in air quality would be considered significant. It is likely that this legislation would be reintroduced

in the 95th Congress.

(2) Geology and Topography

The water pipe line from either the Escalante Reservoir or Lake Powell (Figure 8-2) would pass over the Tropic Shale formation on the Straight Cliffs enroute to the Garfield West generating complex. These Tropic Shales often contain gypsum and are unstable (Schroder, 1971; VTN, 1975. Unstable areas along the Escalante Reservoir to Garfield West pipe line route total 2.5 miles, and along the Lake Powell to Garfield West route, 7 miles.

The coal seam at both sites lies under about 500 feet of cover (VTN, 1975a). An area of from 4,000 to 5,000 acres would be mined. Indications are that the formations would be subject to subsidence (USDI, USGS, 1976a).

(3) Soils

Generally, soils in eastern Garfield and Kane counties and in the vicinity of Escalante have a high erosion hazard and a low probability of successful seeding - less than 50 percent probability. The plant sites, pipe lines, and 30 miles of new transmission line are located on high erosion soils with a low probability of success for seeding.

(4) Vegetation

Vegetation in the Garfield area has been relatively undisturbed except for livestock grazing. The Garfield East site is located in scattered pinyon-juniper and sagebrush (2,000 acres), while the West site is located on a crested wheatgrass seeding (2,000 acres). Table 8-5 (Garfield West) and Table 8-6 (Garfield East) show acreages of vegetation

TABLE 8-5

Garfield West Vegetative Communities

Project Component	Total (mi)	Total (acre)	Mixed Conifer	Mountain Brush	Pinyon-Juniper	Sagebrush	Agricultural	Riparian	Black Brush
			Vegetative Communities (acre)						
Transmission Corridor[a]	30	450	75	120	217	8	30		
Escalante Pipe Line[b]	25	75			64	11			
Lake Powell Pipe Line[b]	48	144			14	54		5	71
Total									
With Escalante Pipe Line	55	525	75	120	281	19	30		
With Lake Powell Pipe Line	78	594	75	120	231	62	30	5	71

[a]Right-of-Way 130 feet.

[b]Right-of-Way 25 feet.

TABLE 8-6

Garfield East Vegetative Communities

Project Component	Total (mi)	Total (acre)	Mixed Conifer	Mountain Brush	Pinyon-Juniper	Sagebrush	Agricultural	Riparian	Black Brush
			Vegetative Communities (acre)						
Transmission Corridor[a]	30	450	75	120	217	8	30		
Escalante Pipe Line[b]	20	60			48	12			
Lake Powell Pipe Line[c]	49	147			15	55		5	72
Total									
With Escalante Pipe Line	50	510	75	120	265	20	30		
With Lake Powell Pipe Line	79	597	75	120	232	63	30	5	72

[a]Right-of-Way 130 feet

[b]Right-of-Way 60 feet

[c]Right-of-Way 25 feet

communities for the transmission lines, the coal conveyor, and the water pipe lines from the dam on Escalante River and from Lake Powell.

Within the area of the Garfield East and West project sites (Garfield and Kane counties) 25 species of threatened and endangered plants occur (Welsh, et al., 1976). A list of the species is shown in Appendix VII-3. Another 20 species of plants that can be found in the area could be considered for inclusion on the list published by the Smithsonian Institute (Welsh, et al., 1976).

Riparian vegetation occupies approximately 363 acres in the vicinity of the reservoir on the Escalante River. Riparian vegetation is unique wherever it occurs throughout the semiarid West because of its aesthetic appeal and wildlife habitat value, and because so much of it has already been lost to town sites, reservoirs, highways, railroads, etc.

(5) Water Resources

The two Garfield sites lie within the Escalante River Basin. The Escalante River is a direct tributary of the Colorado River (Lake Powell) and has an annual discharge of 61,630 acre-feet (as measured during the period 1951 to 1955). The average total dissolved solid concentration of the Escalante River at the mouth varies from 190 milligrams per liter (mg/ℓ) to 410 mg/ℓ with a weighted average of 300 mg/ℓ.

Concentrations of mercury in the Escalante River have not been calculated. However, the concentration in Lake Powell is about 0.1 parts per billion (p/b). Although this amount is small, there is considerable bioamplification which results in mercury concentrations in game fish of over the recommended safe limit of 500 p/b (Standiford, et al., 1973). About 1,800 pounds of mercury from natural sources are deposited in Lake

Powell each year.

There are no known major ground water systems within the Escalante River basin, but there are numerous springs within the river channel from which the communities of Escalante and Boulder obtain their domestic water supply. There is no unappropriated surface water available. Two springs, Oak and Rock, are located over the proposed coal lease area in Alvey Wash, and are the only springs in the lower part of Alvey Wash. The rates of flow are not known, but the springs could be used by livestock and are currently being used by wildlife.

(6) Wildlife

The Escalante River from Calf Creek to Lake Powell fluctuates widely and contains few game fish. However, ten species of fish (primarily suckers, chubs, shiners and dace) occur in this stream segment. Frogs and other amphibians also exist in the streamside habitat.

The comparatively lush vegetation of the canyon bottom supports good populations of small mammals. This, together with abundant cliff nesting sites in the canyon walls, makes the Escalante River important habitat for eagles and other raptors.

Fifty Mile Mountain south of the Garfield plant sites has been designated as a potential area for reintroduction of desert bighorn by the Utah State Division of Wildlife Resources (UDWR).

The transmission line from either Garfield East or West site would pass through deer winter range in Main Canyon and Horse Creek (Figure 8-2), and through a deer-fawning area in Horse Creek. The Southern Regional Office of UDWR considers both Main Canyon and Horse Creek as critical winter ranges, and Horse Creek as a fawning area

(UDWR, 1976e). The area in the vicinity of the proposed sites is only marginal winter range for deer, and only a few deer utilize the area. This area has attracted raptors since the advent of Lake Powell. Golden eagles and bald eagles have been identified (VTN, 1975a).

(7) Cultural and Paleontological Resources

A highly diverse and complex cultural resource base exists at both sites. Alvey Wash supports prehistoric Archaic, Fremont, Anasazi, and historic Paiute and Navajo values in abundance. A Folsom Early Man projectile point was found north of Escalante in 1973 (Fike, 1973). Although primarily limited activity sites exist, this unparalleled broad cultural diversity is necessary for developing a good understanding of the Archaic, Fremont, Anasazi interrelationships and the historic Indian manifestations.

The Anasazi developed basically adjacent to and simultaneously with the Fremont, and were well established within the southern one-third of Utah and adjacent states. With a sedentary agricultural subsistence base, the culture flourished until the mid-thirteenth century.

Early non-Indian activity focused around the Spanish Trail and its variants, the Hole-in-the-Rock Trail, early Mormon colonization, and limited mining activities. The Hole-in-the-Rock Trail would be listed on the National Register of Historic Places. Dance Hall Rock and the Hole-in-the-Rock Trail are both adjacent to the proposed pipe line alternative from Lake Powell. The George Hobbs Historical Site is near the proposed Escalante Reservoir site. The proposed Lake Powell pipe line is within 4 miles of the Kaiparowits Plateau archaeological district.

The full extent of the cultural resource is unknown in this

area because intensive surveys have not been completed. Ninety percent of the sites within the study and project areas would be classed as limited activity.

At Garfield East, a reconnaissance survey was conducted in 1974 by the Brigham Young University (BYU), Department of Archaeology, which documented three sites in the area of the proposed plant site. Two historic ranch settlements were located and one aboriginal lithic scatter (Berge, 1974). The Hole-in-the-Rock Trail passes to the east of the proposed plant site.

At Garfield West, the BYU survey located an extensive aboriginal camp site and two rock art sites, one of which contained evidence of a possible camp site. Fike, in 1973, documented five sites in the area of the proposed generating complex. These sites included two lithic scatters and three open camp sites. One camp site is associated with an overhang. The sites investigated represent portions of the diversified cultural base outlined earlier (Fike, 1973). Although studies are incomplete, the potential for numerous cultural resources does exist. Concentration of sites can be expected, since Escalante was an area of high Indian activity.

(8) Scenic Resources

Landscape characteristics of the area are common to the desert plateaus of central and southern Utah. The most prominent visual elements present in the area are the high, steep-cliff escarpments, high forests, and desert lowland (Figure 8-3). The clarity of the air for viewing scenery is considered very good. Major scenic attractions in the area include:

National Parks and Monuments

Capitol Reef
Canyonlands
Bryce Canyon
Arches
Natural Bridges National Monument

National Forest

Dixie
Fishlake
Manti-La Sal

Recreation Area

Glen Canyon

The landscape character at the East site is open panoramic

FIGURE 8-3

ARID LOWLANDS AND RUGGED ESCARPMENT OF ESCALANTE VALLEY

flat land rising to the nearby (1 mile to the west) vertical walls of the Straight Cliffs (Figure 8-4). The West site lies in an open park-like valley bottom surrounded by steep escarpments (Figure 8-5).

The landscape character of both sites changes from a scenic river corridor enclosed by steep canyon walls (near Lake Powell) to a flat valley bottom and gently folded and eroded bench land at the foot of the Straight Cliffs near Escalante.

The intake site on Lake Powell would be enclosed by the steep, colorful sandstone cliffs characteristic of the area. The pipe line would extend through gently folded and eroded flat lands and bench lands to the East site. The West site could be reached by either extending the pipe line up the Straight Cliffs or by a longer route through Alvey Wash.

The transmission lines from either site would extend through landscape that changes character from the panoramic bench lands at the alternative sites to the increasingly enclosed steep-sloped canyon of the rugged Escalante Mountains. This gives way to the panoramic landscape of the foothills and lowland of Johns Valley. Man's influence in the area has been minimal, with activity limited to dirt roads and trails. The last segment of the transmission corridor would parallel the existing line from Johns Valley to Sigurd. The corridor from the generating complex to Johns Valley is considered isolated and wild.

(9) Land Use

The Garfield West site would be located entirely on national resource lands (2,000 acres). Land ownership of the Garfield East site is partially national resource lands (1,000 acres), and the balance

FIGURE 8-4

PASTORAL SETTING OF GARFIELD WEST

FIGURE 8-5

THE STRAIGHT CLIFFS WEST OF THE GARFIELD WEST SITE

(1,000 acres) state and privately-owned lands.

Agricultural lands are not involved with either site. The 2,000 acres of the Garfield West site was seeded to crested wheatgrass some years ago. Only moderate to good success was attained. All lands on the Garfield East site are undeveloped grazing lands.

The water supply for the plant sites could involve as much as 148 acres in pipe line right-of-way and about 1,200 acres in reservoir area needed, part of which includes lands inside the Glen Canyon National Recreation area near Lake Powell.

Except for a few dry farms, the transmission line route would traverse predominantly undeveloped lands.

(10) Recreation

Much of the zone of influence is remote and undeveloped. Population is low; therefore, there are few urban-oriented recreational opportunities. Outdoor activities such as hunting, camping, fishing, hiking, backpacking, and sightseeing are popular with local residents and tourists. Nearby recreational attractions include Glen Canyon National Recreation Area, Cedar Breaks National Monument, Bryce Canyon and Capitol Reef National Parks, Dixie National Forest, and national resource lands (BLM). Outstanding natural areas, historic and archaeological sites, and scenic attractions are in abundance. Escalante, Utah, the only community near the Garfield sites, provides few recreational opportunities. Large areas within the Glen Canyon National Recreation Area, including portions of the Escalante River, have been determined to be suitable for classification as wilderness. The area will be managed as wilderness by the Park Service until a final classification can be determined. The

Escalante River is highly scenic and is a popular area for hikers and backpackers.

(11) Human Resources

Garfield County is the most sparsely populated county in the state, with a 1970 population density of 0.6 persons per square mile. The county has experienced a steady decline in population since 1940; population dropped 11.7 percent between 1960 and 1970. However, since 1970, this trend has reversed, with the population increasing from 3,157 residents to an estimated 3,400 in 1975 (Bureau of Economic and Business Research, 1976).

The employment base is supported primarily by agriculture, mining, manufacturing, and tourism. Petroleum and coal production are the major mineral activities. Near Escalante, uranium mining is conducted in the Circle Cliff area. Sand and gravel extraction is being conducted near Panguitch. There are two sawmills in the county, at Escalante and Panguitch. Beef and sheep are raised throughout the area.

Per capita income for 1971 was $2,700 compared to $3,390 for the state; medium family income was $7,116. Approximately 12 percent of the families in Garfield County are below the poverty level, compared to 9.1 percent statewide.

The assessed value of all property in Garfield was $11,262,591, of which $552,955 was in Escalante. Presently, the county has no bond indebtedness, but Escalante had $71,000 outstanding in bonds in 1974.

The standard of housing in Garfield County is generally high. In 1970, there were 1,112 year-round dwelling units in the county. There were 189 vacant houses, for a vacancy rate of over 10 percent, reflecting

the decline in county population in recent decades. Some new construction is occurring, with at least six new units reported recently built in Escalante.

The nearest community, Escalante, has a mayor-council form of government. Garfield County Commissioners are members of the Five County Regional Council of Governments.

Presently, the municipal water system can deliver 250,000 gallons per day. There is no sewer treatment system, nor natural gas. Garkane Power Company is currently serving electricity to the Escalante area through a 68-kV line.

There are four elementary schools, one junior high, two combination junior-senior high schools, and one senior high school in Garfield County. One of the junior-senior high schools and one elementary school are located in Escalante.

There are two full-time county law officers and two police officers in Panguitch. Escalante has one marshal and no deputies. Fire protection is provided by the county volunteer fire department and volunteer units in Panguitch and Escalante.

Health services are limited in Garfield County to one 16-bed hospital in Panguitch. There are two doctors and one dentist in Panguitch. One doctor visits Escalante once or twice each week.

Garfield County is comparatively isolated and rural in character. The life style and social structure have remained practically unchanged, mainly because of the remoteness of the area from more rapidly developing areas in the state. The rural character and remoteness of the area express the life style chosen by many who live in Escalante, and thus, economic development has been discouraged by the residents. Mormons

settled Escalante, and it is predominantly Mormons who live there today, some of whom are descendants of the first settlers.

f. Environmental Impacts (Garfield East and West)

(1) Climate and Air Quality

The Garfield West site shows a high potential for atmospheric stagnation and plume trapping, leading to high air quality impacts (Hovind and Elliott, 1973). The Garfield East site is situated so near to the Escalante Rim that certain meteorological conditions could occur, producing high ground level concentrations of pollutants.

The Escalante Rim (Straight Cliffs), 2 miles east of the East site, rises 1,200 feet above the site elevation. Under stable conditions, with an inversion ceiling at approximately 7,000 feet MSL or lower, effluents would be trapped in the valley, and high concentrations could occur near the plant as well as on the adjacent high terrain (Bechtel, 1973). These conditions would be expected to occur most frequently during the late fall and winter. Dispersion conditions would be good during the spring and summer. Diffusion modeling has not been done for this site. However, based on the terrain and similar modeling in other areas, the estimates are considered to be accurate.

The Garfield sites are 50 miles downwind of prevailing upper winds from the Navajo power plant (2,250 megawatts [MW]). Consequently, the potential for cumulative air quality impacts exists should the winds carry plume emissions from the Navajo plant to the Garfield site area.

The Garfield plants may be required to meet the Class I Prevention of Significant Deterioration (PSD) increment in National Parks. Two proposed Class I areas are located approximately 30 miles from the sites.

Capitol Reef National Park lies to the east and northeast. Bryce Canyon National Park is located directly west. A third area, Glen Canyon Recreation Area which may at some later date be nominated as a Class I area, is located 13 miles to the southeast. Though no conclusive studies have been made, preliminary investigations indicate that the Class I increment may not be met. Further meteorological studies would be needed before a generating complex could be built.

(2) Geology and Topography

Construction of the pipe line from either the proposed Escalante Reservoir or Lake Powell may create landslides on unstable Tropic Shale slopes where the pipe line would pass over the Straight Cliffs. Disturbance of these areas, by the removal of soils and vegetation, could result in the unstable slopes becoming more prone to landslides. Landslides would increase soil erosion and sediment production. Because of insufficient data, impacts cannot be determined. Impacts would be of local significance only, considering the small acreage that would be affected (in Garfield County).

The mining of coal for the power plant could result in subsidence on 4,000 to 5,000 acres. Maximum subsidence expected to occur would be from 1 to 5 feet. The broad subsidence pattern over the mine area would most likely assume a concave or "dish-like" shape, hardly perceptible to the eye in most instances because it would be extended over a relatively wide area. The subsidence would represent a permanent change in topography of the area. If subsidence caused severe fracturing of the strata, aquifers could be sufficiently damaged in their water-transporting ability. The effects of subsidence would be local, and only a small

area would be damaged.

(3) Soils

An increase of 11,000 visitor-days of off-road vehicle (ORV) use, which would be double the use occurring at present, is anticipated as a result of the project. This increase in ORV use would increase erosion. The soils, with a high erosion hazard and low probability of success for seeding, are highly mobile and subject to wind and water erosion with the slightest disturbance.

The ORV tracks, which remain for years in these soils, would accumulate water to the point that erosion would occur. The ORV destroy the structure and stability of the soils, loosening individual particles which are then moved by the action of the wind. The significance of these impacts in terms of soil loss, over 3,000,000 acres of eastern Garfield and Kane counties, is impossible to quantify. However, the soil loss would affect soil productivity and would continue as long as the work force for the project were present. Soil losses would be irreplaceable.

Although the generating complex would be located on soils with high erosion hazard, an increase in erosion would not be expected since permanent facilities would occupy most of the complex area. Soil productivity would be lost on approximately 1,500 acres occupied by project facilities for the life of the project. Approximately 100 or 200 acres of soils could be disturbed, of which 80 to 180 acres have soils of high erosion hazard and low probability of seeding success. Soil erosion resulting from construction would increase naturally occurring erosion in the area

by only 0.02 percent. The small increase in erosion would continue until rehabilitation occurred in an estimated 15 to 20 years. The remaining 20 acres (mixed conifer and mountain brush) would be located on soils with a low erosion hazard and high probability of seeding success. Data are unavailable for determining the amount of erosion that would occur on the 20 acres, but erosion would continue for 2 to 3 years until rehabilitation had occurred.

The significance of the impact is difficult to quantify because there are insufficient data for determining the amount of soil that would be exposed and the resultant increase of erosion on the 4,000 to 5,000 acres subject to subsidence.

(4) Vegetation

Off-road vehicle use is anticipated to increase by 11,000 visitor days in Kane and Garfield counties. The ORV use could damage or destroy a number of individual plants of protected species or their critical habitats. Both species and habitat are protected by law, however, the extent of the impact cannot be determined. Studies have not been conducted to determine the exact location or range of these species in the area. Loss of any of the protected species or damage to critical habitat would represent an irreplaceable loss that is of national scientific-educational and aesthetic-recreational importance.

The reservoir on the Escalante River would inundate 363 acres of riparian vegetation. Aesthetic and wildlife values restricted to this unique habitat would be lost for an indefinite period. The loss of 363 acres of riparian habitat would represent less than 10 percent of this type of habitat in the Escalante River drainage.

Approximately 1,500 acres at each of the sites would be occupied by project facilities, and vegetative productivity would be lost for the life of the project (Tables 8-7 and 8-8). Approximately 100 to 200 acres could be disturbed during construction, of which 80 to 180 acres would have a high erosion hazard and a low probability of seeding success. Vegetative productivity would be lost until rehabilitation occurred in from 15 to 20 years. Approximately 20 acres of disturbed vegetation (mixed conifer and mountain brush), with low erosion hazard and high probability of success for seeding and vegetative production, would be lost for from 2 to 3 years until rehabilitation occurred.

(5) Water

The depletion of 10,000 acre-feet per year of Escalante River water would increase the total dissolved solid concentration below Lake Powell by less than 0.3 mg/ℓ (VTN, 1975a). This amount is insignificant when compared to the present 558 mg/ℓ of total dissolved solid concentration below Lake Powell.

The emission of 0.33 pounds per day of mercury vapor (see Chapter 3, Trace Elements) from the stacks could eventually enter into the aquatic environment of Lake Powell, which could result in a proportional increase in the mercury concentration of game fish. The amount of mercury that would enter the lake cannot be quantified at this time; the significance is unknown.

The population influx into Escalante would increase the waste water disposal requirement from a current need of 90,000 to 451,000 gallons per day. At present, the town of Escalante does not have a sewage disposal system; disposal is by septic tank and drain field.

TABLE 8-7

Vegetative Communities Affected by Garfield West Alternative

Project Component	Vegetative Communities (acre)								
	Agricultural	Mixed Conifer	Mountain Brush	Pinyon-Juniper	Riparian	Sagebrush	Black Brush	Crested Wheatgrass	TOTAL
Generating Complex								2,000	2,000
Disturbed								0	0
Occupied								1,480	1,480
Transmission Line	30	75	120	217		8			[a]450
Disturbed (pads only)	2	5	8	14		1			30
Occupied (pads only)	1	2	3	5		1			12
Escalante Pipe Line				64		11			[a]75
Disturbed				64		11			75
Occupied				21		3			24
Lake Powell Pipe Line				14	5	54	71		[a]144
Disturbed				14	5	54	71		144
Occupied				4	1	18	24		47
TOTAL									
With Escalante Pipe Line	30	75	120	281		19		2,000	2,525
Disturbed	2	5	8	78		12		0	105
Occupied	1	2	3	26		4		1,480	1,516
With Lake Powell Line	30	75	120	231	5	62	71	2,000	2,594
Disturbed	2	5	8	28	5	55	71	0	174
Occupied	1	2	3	9	1	19	24	1,480	1,539

[a]Total acreage in right-of-way.

TABLE 8-8

Vegetative Communities Affected by Garfield East Alternative

Project Component	Vegetative Communities (acre)							
	Agricultural	Mixed Conifer	Mountain Brush	Pinyon-Juniper	Riparian	Sagebrush	Black Brush	TOTAL
Generating Complex						2,000		2,000
Disturbed						0		0
Occupied						1,480		1,480
Transmission Line	30	75	120	217		8		[a]450
Disturbed (pads only)	2	5	8	14		1		30
Occupied (pads only)	1	2	3	5		1		12
Escalante Pipe Line				48		12		[a]60
Disturbed				48		12		60
Occupied				16		4		20
Lake Powell Pipe Line				15	5	55	72	[a]147
Disturbed				15	5	55	72	147
Occupied				4	1	18	24	47
TOTAL								
With Escalante Pipe Line	30	75	120	265		2,000		1,990
Disturbed	2	5	8	62		13		80
Occupied	1	2	3	17		1,485		1,508
With Lake Powell Line	30	75	120	232	5	2,063	72	2,597
Disturbed	2	5	8	29	5	56	72	177
Occupied	1	2	3	9	1	1,499	24	1,539

[a]Total acreage in right-of-way.

With the influx of workers and their families (4,512 people) contamination of the Escalante River by inadequately treated waste water could occur. The amount of waste water that would flow into the Escalante River is not known, nor is the impact that the discharge would have on the quality of the river water.

Subsidence following mining operations could intercept ground water aquifers above the mined areas. This disturbance of geologic formations could alter both the ground water and surface water regimes. Rock and Oak springs in Alvey Wash could be affected with the possible loss of an unknown amount of surface discharge.

Sedimentation in local streams could occur because of the erosion-prone soils at the proposed plant site and along the water supply pipe line right-of-way. The magnitude of the results of such increased sedimentation is unknown. However, the effect would be insignificant.

(6) Wildlife

The transmission line from either the Garfield East or West sites would pass through deer winter range in Main Canyon and Horse Creek. The disturbance of this habitat during the winter (January 1 through April 30) would drive deer from critical habitat. Animals thus displaced would be lost, considering that other wintering areas would be at carrying capacity and could not support additional numbers. There are insufficent data to quantify the extent of winter range habitat that would be affected and the number of deer that would be lost, but it would occur only during the construction period (1 year or less).

The transmission line from either of the sites would also pass

through a deer fawning area in Horse Creek. The disturbance of this area during fawning periods (May 15 to July 15) could contribute to the loss of deer fawns, but the loss would occur only during the construction phase which would be less than 1 year. Presently, there are insufficient data to determine the number of animals that would be lost through disturbance of the fawning area.

The 69-kV power line to either the reservoir on the Escalante River or to Lake Powell could be of the type which would electrocute raptors. As indicated, a number of raptors, including the golden and bald eagle, are in the area, and an unknown number of birds would be electrocuted.

As a result of subsidence the water flow from both Oak and Rock springs, the only springs in the lower Alvey Wash, could be reduced or stopped, eliminating deer, small mammals, etc., from areas of otherwise suitable habitat. The number of wildlife species that would be affected is not known.

(7) Cultural and Paleontological Resources

An increase in local and regional populations would occur as a result of the proposed action. This population increase would indirectly impact cultural resources within a 2-hour driving distance of Escalante, Utah. Increased site visitations would indirectly subject all values to partial destruction or total loss. The loss would affect previously undisturbed, archaeological sites.

Indirect impacts would result from recreational activities of two types - illegal activities associated with artifact collection and treasures hunting, and recreational uses, i.e., hiking and backpacking,

hunting, and ORV use - which intentionally or unintentionally would result in site damage, site erosion, etc. Cumulatively, these activities would pose a serious threat to a nonrenewable, irreplaceable, interpretive-educational and aesthetic-recreational resource.

Cultural values within all proposed construction zones and disturbed areas would be subject to direct negative impacts. Surface disturbance through construction activities could displace artifacts, their context, and their relationships to each other. This impact would result in the partial or total loss of scientific values. Eleven diversified cultural sites would be disturbed or destroyed in the area of the proposed plant sites. Other cultural sites undoubtedly could be found through intensive survey.

Direct impacts could occur to the Hole-in-the-Rock Trail, and indirect impacts would affect the George Hobbs Historic Site and the Kaiparowits Plateau archaeological district. Table 8-9 presents an estimate of sites that could be affected by the project components. These data are based on existing information from areas surrounding the proposed action.

Should sites encountered be scientifically explored (salvaged), a beneficial impact in the form of knowledge would be realized. However, removal of data today would limit what could be gained by preservation, as future advancements in the technology would yield a higher percentage of recoverable information. Losses could also occur to the aesthetic-recreational and the interpretive-educational quality of the resource.

TABLE 8-9

Predicted Frequency of Occurrence of Cultural Sites

Project Component	Frequency[a]		
	High	Medium	Low
Generating Complex	X		
Coal Source			X
Coal Transport	--	--	--
Water System	X		
Transmission Lines	X		
Work Force	X		
Overall Component Impact Rating	X		

[a]High - 7 or more sites occur in area; medium - 4 to 6 sites occur; low - 3 or less occur.

(8) Scenic Resources

The construction of the Garfield West industrial complex in Little Valley would greatly change the scenic quality and landscape character by introducing man-made contrasts. Persons who enter the valley or view it from the plateau would expect a natural scenic experience, but instead, would be subjected to a reduced visual and aesthetic experience However, the enclosed character of the valley would eliminate the possibility of the complex being viewed from Highway U-54, 8 to 9 miles to the east.

The Garfield East generating complex would also create a man-made contrast by introducing a visually prominent industrial intrusion into a natural landscape. The complex would be located 4 to 5 miles from Highway U-54. The panoramic character of the area would permit a

long-term viewing of the complex from Escalante and Highway U-54. The contrast would be high.

Visual impacts at the proposed coal source for Garfield West would be limited to those who would enter Little Valley and view the mine entrance, roads, and buildings. Some people would be sensitive to this change, the intrusion being viewed in the foreground and middleground. The visual contrast would be medium.

The Garfield East site would receive coal from a drift (horizontal entry) driven at the base of the Straight Cliffs west of the complex. The entry would be elevated, thus increasing the visual intrussion which would be viewed by more persons for a longer period. The visual contrast would be medium and would lie in the middleground and background.

The proposed dam on the Escalante River would introduce an intrusion into the natural landscape character and eliminate the present feature of moving water. The water body created would add a different element of variety into the landscape character. This would have a moderate effect on the scenic quality of the site.

The intake and pump structures and the power lines would introduce an intrusion of form and line that would create a moderate contrast with the landscape character.

The intake pipe and pump structure on the shore of Lake Powell would change the landscape character by creating man-made contrast in the Escalante arm of the lake. This could cause a loss of visual and aesthetic experiences for those entering the viewing area. The public could view the intrusion at close range (most people are very sensitive to aesthetic change). The contrast could be considered medium, but

would only be viewed for a short time by few people. The maintenance road, pump structures, pipe line, and power lines would create a low visual man-made contrast, conflicting with the present wilderness character of the area.

The corridor clearing and road construction for the proposed transmission line would create a man-made contrast of a medium impact; there is very little man-made contrast within the corridor at present. The straight lines and vertical appearance of the structures and the reflective qualities of the towers and lines would create a man-made contrast of medium impact.

(9) Land Use

Impacts would result from the transfer of federally-owned national resource lands to private ownership and subsequent industrial development. Public land uses could be terminated on 2,000 acres of national resource lands at the Garfield West site and on 1,000 acres on the Garfield East site.

About 2,000 acres of crested wheatgrass pasture would be destroyed at the Garfield West site. The animal unit month (AUM) loss would be approximately 400 annually (estimated forage production of 4 acres per AUM). Based on the calculation that one AUM of forage would produce 30 pounds of meat, the total annual loss of meat would be about 12,000 pounds, or equivalent to the annual consumption of about 75 people (see Appendix IX).

Loss of livestock forage on as much as 144 acres disturbed in the pipe line rights-of-way would be temporary (3 to 5 years) and minor. However, about 1,200 acres of undeveloped land area would be permanently

inundated at the proposed reservoir site. This would result in the permanent loss of about 80 AUM of livestock forage (based on 15 acres per AUM forage production), or a meat loss on the hoof of about 2,400 pounds - the annual consumption of 17 persons.

Impacts of land use commitments could involve a maximun of 17 acres of land inside the Glen Canyon National Recreation Area for the pipe line right-of-way and pump site. Complicated land use problems could be encountered on these lands because of present management practices for wilderness areas by the National Park Service.

Transmission lines would not impact major population areas, nor have a significant effect on present uses.

(10) Recreation

The influx of over 5,273 people into the area would greatly impact recreational sites. Overcrowding of presently limited recreational facilities may cause the deterioration of physical improvements and environments (vegetation, soils, water quality), and change the quality of recreational experiences.

The construction of a dam, pumping station, and pipe line could preclude the wilderness designation in the Escalante River area. Hiking and backpacking in the canyon would also be affected by the water blocking the access. The Lake Powell pipe line could affect the quality of use on the Hole-in-the-Rock Trail, as well as other historic, scenic, and natural features, with the elimination of some wilderness values, since the pipe line would follow the trail from the plant to Lake Powell.

(11) Human Resources

The socioeconomic impacts of the proposed action at either

Garfield site would be the most severe of all alternative sites considered. This would be due to the sparsely populated character of the area, the present lack of homes, and the lack of community facilities. Escalante would experience almost all of the impacts from plant construction, plant operation, and mining.

It is estimated that the population would reach its highest point in the fourth year of construction when approximately 700 construction workers, 600 miners, and 249 plant operators would be employed. This would increase the total population to 5,273, or six new persons for each existing resident of the Escalante current population of 900.

Employment opportunities would increase in the county. Some jobs would be filled by local residents, but most would be filled by persons coming from outside the community. The area would add about 1,500 new permanent jobs bringing in an additional income of about $19.8 million per year. Most of the income would be earned by the incoming people, and initially much of the money would be spent outside the community because of the lack of adequate shopping facilities within the community.

The available services would be severely taxed. Escalante would become a one industry town, and since construction of the plant would require only temporary employment, the services sector of the town would be inadequate during the construction phase of the project.

The city and county bonding capacity would be overstressed at first, but would grow rapidly. The plant would generate $670,000 in sales tax revenue and at least $2.9 million per year in increased property taxes.

Housing requirements for the population would peak at about

1,500 new units by 1978. The population influx and housing demand would overwhelm the town of Escalante.

The organization of local government would not be expected to change, but the impacts on local government would be far-reaching. Elected officials may not be reelected when opposition from the newcomers employed by one of the energy-related companies becomes organized. If newcomers move in in sufficient numbers, they could dominate local governments in some towns.

The Escalante city water system has limited storage and delivery capacity. Although plans exist to replace the system, the impact of over 4,500 additional people in the community would exceed present water treatment and delivery capacity. There is no sewage treatment plant in any of the local communities. There are no natural gas supplies and residents would be forced to use other heat sources for their homes. Because of other industrial uses, the 69 kV line which now services Escalante would require reconstruction from Henrieville to Upper Valley (approximately 20 miles) should the plant be built.

An influx of approximately 1,000 (peak 1,221) grade school and high school students would require the building of at least 53 new classrooms; 55 new teachers would be needed. Additional operating funds would be required for classroom construction.

Nine new policemen would be required and at least three patrol cars would be necessary for patrolling the Escalante area. Fire protection would require augmentation through new equipment. A medical clinic, with an adequate staff, would be needed. The present visiting doctor (one day per week) would be unable to care for the increased

number of patients. Two additional doctors would be needed. The new clinic would help attract medical personnel to the area.

A significant impact would be the change in traditional life styles and social values. Despite some industrial development, the Escalante area has retained its historic agrarian character. Present day residents are less receptive to growth and development than those in most other areas of the state and have been able to preserve their way of life primarily due to their relative isolation. The effect of the proposed plant would be the complete disruption of the existing life style which would probably produce hostility and antagonism between the native population and new residents due to the differences in ideals, beliefs, and social values.

g. Mitigating Measures

(1) Requirements

Mitigating measures required by federal, state, and local entities and committed to by the Company, are the same for the Garfield East and West sites, and would be implemented under the same authority as that presented in Chapter 4 for the Emery site, with two exceptions. The authority for rerouting the pipe line right-of-way to avoid unstable areas would come under the Right-of-Way Act of February 15, 1901, and the authority for the design of power line structures to prevent the electrocution of raptors would come under the Right-of-Way Act of March 4, 1911.

(2) Geology and Topography

The proposed pipe line from either the Escalante Reservoir or

Lake Powell could be routed to pass over relatively stable portions of the Tropic Shale on the Straight Cliffs to the Garfield West site and thus avoid unstable areas.

(3) Soils

Through mitigating measures, erosion could be reduced on disturbed areas by restoring the natural cover protecting the soil to reduce the velocity of surface runoff. The amount of erosion that could be reduced is unknown.

It is assumed that accelerated erosion would be halted through rehabilitation, which increases ground cover and reduces water velocity, within 2 or 3 years on the approximate 20 acres that have greater than 50 percent chance of normal range seeding success. An estimated 15 to 20 years may be needed to rehabilitate about 80 to 180 acres disturbed on highly erosive soils with less than 50 percent chance of range seeding success.

(4) Vegetation

Through mitigation on disturbed acres where vegetation would be removed (approximately 100 or 200 acres), the vegetative cover could be restored within 2 to 3 years on the 20 acres that have a greater than 50 percent chance of normal range seeding success. It is estimated that 15 to 20 years would be required to revegetate the 80 to 180 acres that would be disturbed on highly erosive soils with less than 50 percent chance of range seeding success.

(5) Water Resources

A decrease in soil erosion and the establishment of ground

cover would, in turn, bring about a reduction of the amount of siltation in the water, thus enhancing the water quality.

(6) Wildlife

Deer are very sensitive to harassment during the fawning season and during the later months of the winter season. Does have been known to abandon their young when harassed. During January through April, deer are in a weakened condition and any disturbance may cause them to go into shock which could cause death. If construction were prohibited during critical winter and fawning periods, many deer on federal lands could be saved.

By proper construction, it would be possible to eliminate the probability of electrocuting raptors on the power lines to the pump station at the Escalante Reservoir and at Lake Powell (Miller, D., 1975).

There is no practical method to mitigate the loss of wildlife that would occur as the result of reduction or elimination of the water flows from Oak or Rock springs in Alvey Wash due to subsidence.

(7) Cultural and Paleontological Resources

The Federal Government seeks to preserve and protect prehistoric and historic cultural values from inadvertent damage or loss through field identification and evaluation surveys. Relocation of project components would be encouraged in order to protect archaeological resources. Salvage action would only be a last resort measure after all other feasible means have been considered for preserving or protecting a resource in its original condition and context.

Intensive surveys in all areas of the proposed sites should

locate all but buried archaeological resources. Such surveys must be conducted by qualified persons with federal approval. All survey and salvage costs should be borne by the applicant.

If the survey work were contracted, the archaeological contractor would be required to submit an evaluative report to the authorized federal officer. Findings, suggested recommendations for mitigation, and evaluation of archaeological resources would be contained in the report as outlined in Section 106 of the Historic Preservation Act, and in Section 2,b of Executive Order (E.O.) 11593. The responsible federal agency would review the report recommendations to decide proper mitigation.

Any changes in alignment, adjustment, or relocation of the proposed facilities would require reevaluation of the archaeological survey. This procedure would protect sites not previously subject to direct impact that may have become endangered as a result of route change or relocation of facilities.

The effectiveness of field surveys is limited to the skills of the evaluator. The survey can only evaluate visible cultural data. If a buried site were discovered, the chances of federal representatives being on the scene would be slight, and the correct action would probably not be taken unless the construction foreman was committed to the mitigating measure.

Protection of archaeological and paleontological resources under State of Utah jurisdiction is improving through use of identification, evaluation, and salvage operations.

The Federal Antiquities Act of 1906 provides for the protection and preservation of vertebrate fossils of an actual historic or scientific

interest, or of some unusual significance. Similarly, the National Environmental Policy Act of 1969 could be interpreted to include paleontological values under Section 101 (b). This section directs all federal agencies "to preserve important historic, cultural, and natural aspects of our National heritage..." In order to ensure adequate protection and proper preservation, such measures as survey, evaluation, relocation, or salvage may be deemed necessary. Presently, the law would pertain only to federally-administered lands.

(8) Scenic Resources

Qualified field specialists from each federal agency involved should aid in the preparation by the applicant of a "construction plan." This document would assist in assuring compliance to mitigating measures. The implementing action would take place "on the ground" over the entire system site assuring that visual contrasts would be reduced by revegetation, vegetative screening, restricted trimming, and minimal soil disturbance, and by route selection, dust control on new construction, and selection of compatible paints or material colors for all structures.

The extent of mitigation cannot currently be ascertained, but it could be considerable.

Visibility and contrast would be reduced by trimming trees (but not removal) near the power lines and by leaving vegetative buffer zones adjacent to stream crossings. This would reduce visual impacts from construction along transmission line from the plant to Johns Valley.

(9) Land Use and Human Resources

Mitigation of impacts to land use and human resources cannot be considered real and committed; the reason being that these mitigations

cannot be established or enforced by those federal agencies now preparing the ES, who are envolved in the federal actions (permits, leases, etc.) required for construction of the project.

h. Unavoidable Adverse Impacts

(1) Air Quality

The deterioration of air quality at the Garfield sites would be greater than that at any of the other alternative sites. The Garfield sites would be subjected to a greater number of stagnation episodes or weather conditions that lead to higher than normal pollution concentrations. Although no air quality modeling has been performed for the particular sites, modeling for the proposed plant and for other sites indicates that the 3-hour SO_2 National Ambient Air Quality Standards (NAAQS) of 0.5 parts per million (p/m) could be approached or exceeded. Studies on physical effects of SO_2 show that concentrations above 0.3 p/m to 1.0 p/m in air can be detected by taste (EPA, 1970a). Based on the same modeling predictions the particulate and NO_2 concentrations probably would not be detectable.

(2) Geology and Topography

An area of from 4,000 to 5,000 acres would be subjected to subsidence of 1 to 5 feet as a result of removal of 50 percent of the coal. Subsidence would produce a permanent change in topography over the area affected.

(3) Soils

Off-road vehicle use (11,000 visitor days by 1981) by the

increased population related to the Garfield project would cause cumulative soil erosion effects in eastern Garfield and Kane counties. An estimated 3,000,000 acres would be affected for the life of the project.

Surfaces covered by structures, such as buildings, roads, conveyors, etc., would account for the loss of potential productivity on an estimated 1,500 acres. The loss would continue for the life of the project.

For 3 years during construction, productivity on approximately 100 to 200 acres of soil would be lost. Lost production and accelerated erosion would continue for 2 to 3 years on 20 acres, and for 15 to 20 years on 80 to 180 acres.

(4) Vegetation

Approximately 1,500 acres would be permanently occupied by project facilities for the lifetime of the generating complex, eliminating the production of vegetation for that period. Loss of this vegetative production would be irreplaceable at the site. The loss would be of local importance.

Vegetative production would be reduced on about 100 to 200 acres disturbed during construction. The vegetative cover and production could be restored within 2 to 3 years on 20 acres that have a greater than 50 percent chance of normal seeding success. It is estimated that 15 to 20 years may be required to revegetate the 80 to 180 acres that would be disturbed on highly erosive soils with less than 50 percent chance of range seeding success.

With construction of the reservoir on the Escalante River, 363 acres of riparian vegetation would be lost. Riparian vegetation is

unique wherever it occurs throughout the semiarid West because of its aesthetic appeal, and because much of it has already been lost to town sites, reservoirs, highways, railroads, etc.

(5) Water Resources

Either Garfield alternative would increase average total dissolved solid levels in Lake Powell by about 0.3 mg/ℓ. An unknown but obviously slight increase in mercury levels in Lake Powell could be expected. The probability exists that the Escalante River could be contaminated by untreated or inadequately treated waste water. Waste water discharge would increase from 90,000 gallons per day in 1976 to 451,000 gallons per day in 1981. The amount of the untreated waste water that would flow into the river and the effect on water quality are not known.

Subsidence following mining operations could intercept ground water aquifers above the mined areas in Alvey Wash. Oak and Rock springs could be affected with the possible reduction of a unknown amount of surface discharge. Reduction or changes in water sources could affect wildlife which is dependent on these waters. The magnitude of this impact cannot be estimated.

(6) Wildlife

By prohibiting construction during critical periods on winter range in Main Canyon and Horse Creek and in the fawning areas in Horse Creek adverse impacts to deer would not occur.

As a result of subsidence the surface discharge of both Rock and Oak springs could be reduced or eliminated. This would cause loss of deer, small mammals, etc., from an area of otherwise suitable habitat. The number of individuals or wildlife species affected is not known.

(7) Cultural and Paleontological Resources

Sanctions imposed upon the population would not be fully effective within the primary influence zone (a 2-hour driving distance of Escalante), nor would such sanctions alleviate the losses which would occur to the cultural and paleontological resources. The degree, extent, and magnitude of adverse impacts that would occur are unknown.

Even with full implementation of proposed mitigating measures, damage and loss of values would still result to the cultural and paleontological resources. Because surveys are incomplete, the extent of loss cannot be predicted. Damage could occur to subsurface values not initially discovered through field inventories. Current limitations in location, recovery, and analytical techniques would result in destruction of certain contexts and relationships between specimens and their environment during recovery operations proposed as mitigating measures. Removal of whole segments of the archaeological or paleontological resource could seriously impair or prevent future opportunities for unbiased scientific investigations or interpretation, as well as the opportunities for recreational, aesthetic, and educational purposes.

(8) Scenic Resources

The generating complex and associated facilities would change the landscape character by creating a major industrial intrusion into the park-like valley. Effects would include change in color, form, line, and texture of the natural setting caused by clearing and grading operations, and by the construction of buildings, roads, dumps, evaporation ponds, conveyor systems and power lines. These changes would be seen by a few persons at the West site, and by many more at the East site (traveling

U-54). The permanent facilities would present changes in the landscape character that could not be avoided, even though appropriate design, color, and screening were provided.

The intrusion of coal mine portal facilities would also change the landscape character. The coal transportation system would be seen by more people if the Garfield East site were selected. The contrast could be reduced but not completely eliminated.

The landscape character of the Escalante River water source would change as a result of construction of the dam and reservoir. Construction of the pipe line would introduce some above ground man-made intrusions. Most of the soil and vegetative loss could be partially mitigated but not completely avoided.

A lesser change in landscape character would occur at the Lake Powell source because no new water body would be created. Yet, there would be a change caused by the introduction of man-made intrusions. Even if the construction were designed to blend into the landscape, contrast could not be completely avoided.

The transmission system would create a major intrusion in a natural landscape, resulting in a loss of back-country character. The man-made contrast created by the construction of the power line could be reduced by proper design and location, but the contrast could not be completely avoided.

Impacts of the commitment of up to 669 acres of land to right-of-way use would be considered permanent for the life of the plant. The 1,200 acres of livestock forage lost to inundation, if the Escalante River Reservoir were constructed, would be permanent for the life of the project.

(9) Recreation

Overcrowding and overuse of recreational sites would probably occur, causing deterioration of physical improvements and natural environments. The town of Escalante, Utah, would be incapable of providing needed recreational facilities for several years. Wilderness and wild and scenic river classification would be precluded on and near portions of the Escalante River. Conflicts with the Hole-in-the-Rock Trail and with other scenic and natural features could not be mitigated.

(10) Human Resources

Either Garfield complex would cause overwhelming unavoidable impacts to the Escalante area. The new population would demand additional housing, utilities, educational facilities, and public services. Services and facilities presently available can barely meet existing demand.

One significant impact would be the alteration of the existing traditional communal structures and values shared by the present community and county residents.

The number of construction workers would fluctuate, but the population would peak at approximately 5,270 persons if the project were built. The new population would completely fill existing housing, and 1,500 new homes would have to be built. The housing shortage could last throughout the period of construction of the plant. Campers and trailers could be brought in to alleviate the housing shortage.

The organization of local government would probably not change, although local elected officials could be displaced.

Water and sewer systems would have to be built to meet requirements for about 1,500 homes. Presently, this capability does not exist.

The presently available spaces in the schools would be filled by the increasing number of students. In addition, about 53 classrooms and 55 teachers would be needed in Garfield County to accomodate the project-related growth.

The project would increase the need for police in the impact area. Nine additional police officers would be required. Hiring may be difficult since the salary range may not be competitive with mine and construction pay.

If the project were approved, the community would need improved fire protection. Escalante would need a full-time fire department with necessary equipment.

Two additional doctors would be required to meet the medical needs of the increased population. Since the area is isolated it may be difficult to recruit doctors.

A change in the quality of life would continue to occur as the population increased. In a small community where knowing one's neighbor and open spaces are important factors in the quality of life, impacts of urbanization would be obvious. Some aspects would improve, however, with further availability of employment, goods, and services.

3. Sevier Valley Site

a. Site and Plant Description

The Sevier Valley alternative site would be in the vicinity of sections 28, 29, 32, and 33, T. 20 S, R. 1, E, in Sanpete and Sevier counties, Utah (lat. 39° 10' N, long. 111° 49' W). This site is about 3 miles northeast of Redmond and 8 miles south of Gunnison. The Sevier

Valley site is shown on Figure 8-6.

A detailed design has not been completed for this site, but it is anticipated that the Sevier Valley complex would contain the same elements as the Emery site proposal, differing only in relative location and detail.

U.S. Highway 89 and the Denver and Rio Grande Western Railroad are immediately west of the site.

Coal would be trucked 30 to 40 miles on Utah Highway 10, Interstate 70, and U.S. Highway 89 from coal fields in the Old Woman Plateau on the eastern edge of the Wasatch Plateau.

Water would be supplied by the Highland Canal located at the foot of the hills to the east. Additional water would be provided by construction of a dam across Willow Creek in Section 27. Supplemental water could be supplied by Willow Creek Reservoir (section 36, T. 20 S, R. 1 E).

Limestone for operation of SO_2 scrubbers would be hauled from a commercial quarry northeast of Millard County, a distance of about 50 miles.

It is anticipated that the same number of construction and operating personnel would be required as proposed for the Emery site. The workers would commute from as far as Nephi, 50 miles north, and from closer towns such as Manti, Gunnison, Salina, and Richfield.

Stack emissions would meet applicable state and federal regulations.

There would be no discharging of waste waters from the generating complex; the waste water would be collected in an evaporation pond.

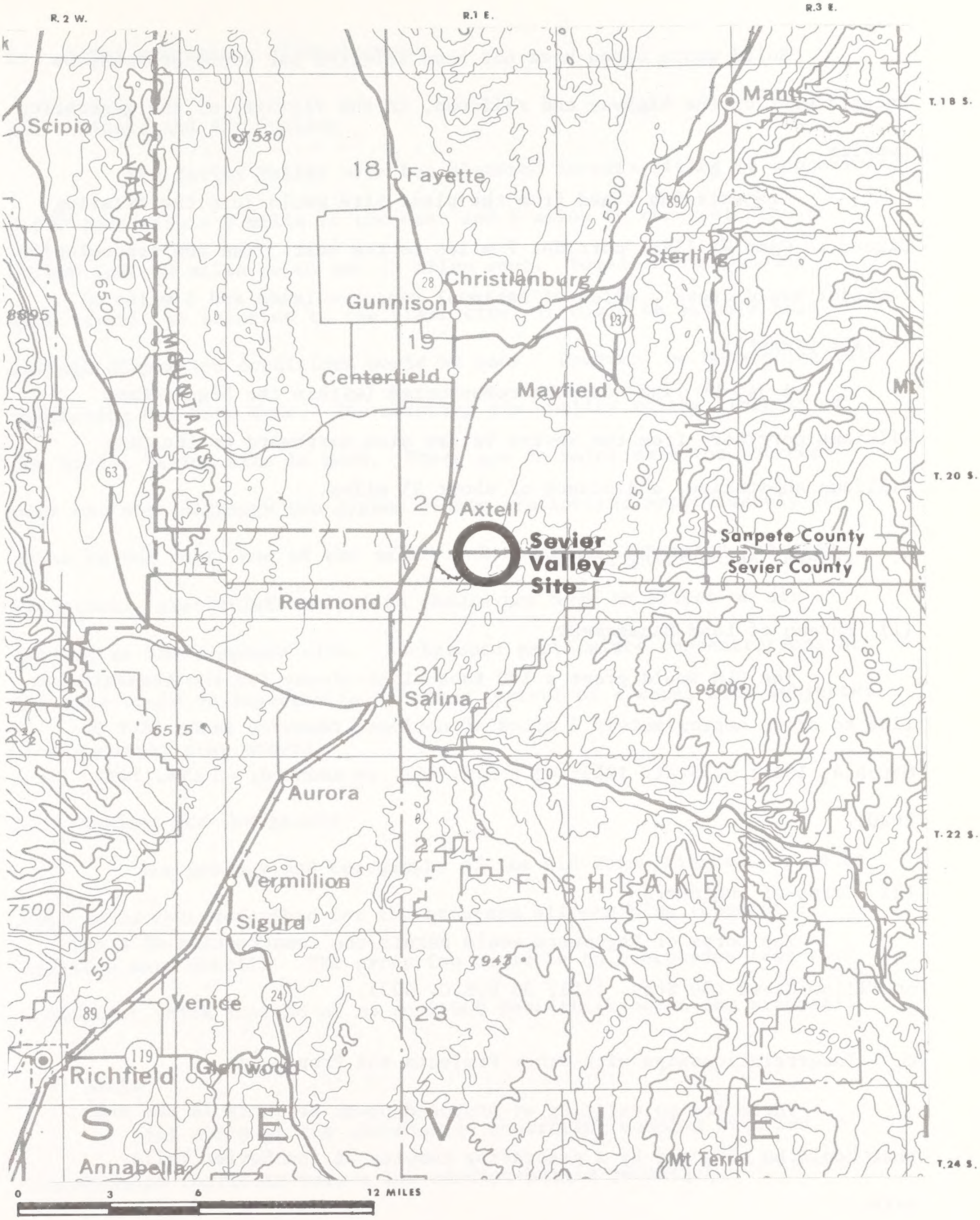


FIGURE 8-6

SEVIER VALLEY SITE LOCATION

Solid waste sites have not been selected but would probably be located west of the highway and railroad, in the vicinity of the generating complex.

Transmission lines from the plant site would join the existing Sigurd to Camp Williams corridor 7 miles to the west. The new transmission corridor would cross 2 miles of national resource lands and 5 miles of private property.

A 345-kV line would be constructed (within the Sigurd-Camp Williams corridor) from the Sevier Valley site northward to the Camp Williams substation, a distance of about 95 miles.

b. Federal Authorizing Actions

(1) Bureau of Land Management

The BLM would grant a 130 foot right-of-way for the transmission line to cross approximately 2 miles of national resource lands (Act of March 4, 1911; 36 Stat. 1253; 43 U.S.C. 961; as amended; 43 CFR, Part, 2620).

(2) Corps of Engineers

The Corps of Engineers would permit the construction of a dam on Willow Creek (30 Stat. 1151; 33 U.S.C. 403).

c. Interrelationships with Other Projects and Proposals

There are no existing or proposed power projects in the area that could be affected by a generating complex at the Sevier Valley site.

Air quality at the site has already been adversely affected by existing gypsum mills.

d. Brief Discussion of Environment

(1) Climate and Air Quality

The Sevier Valley site has elevated terrain rising to approximately 8,000 feet within 8 miles to the east and 9 miles to the west, and to 10,000 feet 20 miles south and 15 miles west. Based on surrounding high terrain in relation to the plant site, it could be assumed that average dispersion conditions would be poor. However, no meteorological monitoring has been done. The existing air quality in the vicinity of the Sevier Valley site is good. There are no major emission sources near the site although two gypsum plants are located approximately 20 miles to the south end of the valley. Because of dispersion and wind conditions, particulate emissions should not have an effect on air quality at the proposed site. Background particulate concentrations at the site would be expected to be those typical of a rural area subjected to occasional dust storms.

(2) Geology and Topography

The geology and topography of the Old Woman Plateau, would be similar to that described for the proposed Wilberg Mine (Chapter 2 contains more detail). The exception would be an overburden less than 1,000 feet thick instead of up to 2,000 feet thick as at the proposal.

(3) Soils

All soils at the alternative generating complex site and transmission corridors have a low erosion-hazard potential.

(4) Vegetation

The generating complex site is on a saline alluvial fan

supporting low-growing saltbush and a few other salt tolerant species. The vegetation has been heavily grazed for many years. Fifteen species of threatened and endangered plants occur in Sevier, Sanpete, Utah, and Juab counties (Welsh, et al., 1975). See Appendix VII-4 for list.

Due to past abuse, it is unlikely that any threatened or endangered plant species could still be found in the area; however, no intensive survey has been made to determine the presence or absence of such species.

(5) Water Resources

The proposed Sevier Valley alternative site is within the central Sevier River Basin. The Sevier River west of the site has an average annual flow of about 56,700 acre-feet (1931-1960 period). The quality of the water is degraded significantly in the area of the site. Upstream from the proposed plant site, near Richfield, the total dissolved solids concentration averages about 360 mg/ℓ; downstream, near Fayette, the concentration averages about 1,700 mg/ℓ (VTN, 1975a). This degradation is the result of return flows from irrigation (which carry salts from local marine shales) and inflows of mineralized ground water.

Ground water in alluvial deposits exists throughout the valley, both as a water table (unconfined aquifers); and as artesian water (confined aquifers). About 19,000 acre-feet per year are presently being utilized for agricultural and domestic needs. Many wells are producing water from unconsolidated materials less than 150 feet below the surface (Jeppson, 1968).

(6) Wildlife

The alternative site, located on heavily-grazed range land,

does not presently provide habitat for any major wildlife species. Vegetation necessary for wildlife food and cover is lacking. The area through which the transmission line would pass (7 miles distance) is also lacking in wildlife habitat.

(7) Cultural and Paleontological Resources

The archaeological record for the area is fragmentary; surveys are incomplete. Site densities for the region are low; and about 90 percent of sites located would be classified as limited activity showing only surface scatters. Frequency and complexity of sites are low.

There are no National Register historical sites in the areas of this alternative.

It is believed few archaeological sites exist in the area of the generating complex site or coal source. Few sites are expected to be found within the 7 miles of proposed transmission line corridor. This alternative site is not expected to have the concentration of resources identified with the Emery proposal. Few, if any, non-Indian historical sites would be encountered.

(8) Scenic Resources

The landscape characteristics are common to the broad, semi-arid valleys of central Utah. The most prominent visual elements are agricultural valleys surrounded by steep, rolling mountains. The clarity of the air for viewing scenery is considered good. Major scenic attractions include National Forests, national resource lands, and state recreational areas. The landscape is dotted with farm and ranch buildings, the major scenic elements of the land.

The major landscape character is of panoramic agricultural bottom land in the Sevier Valley (Figure 8-7).

(9) Land Use

Limited livestock grazing is the only present use of the land. Transmission line routes would traverse undeveloped grazing lands and some scattered dry farm lands.

The area is served by Interstate Highways 15 and 70, and U.S. Highway 89. Popular nearby recreational areas include Fishlake National Forest, Capitol Reef National Park, the San Rafael Swell, and BLM-managed lands.

FIGURE 8-7

AGRICULTURAL LANDS AT SEVIER VALLEY SITE

(10) Human Resources

The larger communities near the Sevier Valley alternative site are Richfield, Salina, and Gunnison (Figure 8-6). Most-recent population estimates (1975) indicate populations of 5,100 in Richfield, 1,800 in Salina, and 1,300 in Gunnison. Sevier County has an estimated population of 12,700, and Sanpete County has an estimated population of 12,400 (UIDIS, 1975).

The major commercial activities in Sevier County are mining, agriculture, forest products, and wholesale and retail trade. Major mineral products are: gypsum, produced at Sigurd by the Georgia Pacific Company and U.S. Gypsum Company; coal, mined in Salina Canyon by Southern Utah Fuel; and clay and salt production near Redmond. Leading agricultural products are meat, fowl, livestock forage, and dairy products. There are 12 manufacturing plants in the county.

In 1974, the per capita income in Sevier County was $3,854, substantially below the state level of $4,468 for that year (Department of Commerce, 1974). Also, 13.8 percent of the population was below the poverty level, compared to 9.1 percent for the state.

The total property tax collected in 1973 by all taxing units within Sevier County was $1,555,723. There was no county-bonded indebtedness as of January 1, 1974. Richfield had an indebtedness of $26,000.

Housing in Sanpete and Sevier counties is limited.

There are city-owned water systems in Richfield and Salina with provisional State Health Department ratings. Salina has a water storage system with a 1,500,000 gallons capacity and a deliverable rate of 1,000,000 gallons per day. Peak demand in 1973 was 500,000 gallons

per day. The Richfield system has a storage capacity of 1,000,000 gallons and a deliverable rate of 2,600,000 gallons per day, which was reached on peak days in 1973. In 1974 Redmond raised water hookup fees to discourage additional people from building in the community.

Salina has a trickling-filter sewage treatment system with a capacity equivalent of 14,000 population. It is presently at capacity because of the industrial load. The Richfield trickling-filter system has the same capacity (1,000,000 gallons), and an average daily load of 650,000 gallons. Richfield has recently run new sewer lines into the northern and southern portions of the city and is planning improvements for which partial funding has been approved by the voters.

Richfield has four schools - two elementary, one junior, and one senior high. The secondary schools are near capacity enrollment. Salina has one junior-senior high, and one elementary school. In Richfield, the Sevier Valley Technical College is currently building a new facility.

Richfield has eight police officers and a police chief. There are six police vehicles; two more are being purchased. A new jail, with facilities to handle federal prisoners, has been built. The Sheriff's Department, a cooperative unit within the police department, has four deputies and three jailers (which are in addition to the Richfield police force). Salina has two police officers and a police chief, with three positions open. Sevier County has 17 highway patrolmen and one dispatcher.

Fire protection in Richfield consists of a volunteer crew of 25 men serving an estimated 7,000 population within a 10-mile radius. Salina also has a volunteer fire department.

Richfield has a new 42-bed hospital. The new facility has a resident radiologist, 12 full-time nurses, and four part-time nurses. There are also four physicians and nine nurses in Richfield. Salina has two visiting physicians (one day each week) and two full-time nurses. The Gunnison Valley Hospital in Gunnison has 21 beds.

Because of the more open and diverse character of the community, new residents in Richfield have been assimilated without many of the negative attitudes that are evident in the smaller communities in the area.

The major highways in the site area are U-89, and I-70. Highway U-89 are carrying 3,240 vehicles daily, and I-70 is carrying 1,825 daily. Highway U-89 is nearing carrying capacity, but I-70 is far below carrying capacity.

The transmission lines would not pass through any urban or suburban areas.

e. Environmental Impacts

(1) Climate and Air Quality

Average dispersion conditions are expected to be poor due to nearness of the site to elevated terrain. Based on such conditions, the air quality impacts could be greater at this site than at other alternative sites. Balanced against this is the fact that the site is more removed from National Parks, recreational areas, and other areas with potentially stringent air quality classifications than some other sites considered.

(2) Geology and Topography

Subsidence on the east edge of the Wasatch Plateau could

affect 4,000 to 5,000 acres by increasing soil erosion and disrupting surface and underground water flows. These impacts could affect livestock grazing. The impacts would be similar to those described in Chapter 2 at the Wilberg Mine site.

(3) Soils

The construction of plant facilities at the Sevier Valley site would disturb about 2,000 acres of soil, of which approximately 1,500 acres would be occupied. Disturbance of 100 to 200 acres of soils would not cause any measurable increase in erosion because of low erosion potential of the soil. The same would be true for the area disturbed for the 7 miles of new transmission corridor. Soil productivity would be lost on about 1,500 acres for the life of the project and on 100 to 200 acres for from 5 to 10 years.

(4) Vegetation

Increased ORV use may damage or destroy threatened and endangered plants, or their critical habitat. The significance of the impact cannot be ascertained as studies have not yet been conducted to determine the exact location or range of species in the area. Loss of any of these species or damage to their critical habitat would represent an irreplaceable loss that would be of national scientific-educational and recreational-aesthetic importance.

Vegetative productivity on about 1,500 acres would be lost during the life of the project as this acreage would be permanently occupied by project facilities.

Vegetative production would be reduced on 100 to 200 acres

disturbed during construction. The vegetative cover and production would be irreplaceable on disturbed acreage. The loss would be of local importance only.

No measurable impact would occur to livestock or wildlife by the removal of about 1,500 acres of vegetation and permanent occupancy with project facilities for the life of the project. The same would be true of the 100 to 200 acres of vegetation disturbed during construction. The present vegetation provides poor livestock forage and wildlife habitat.

(5) Water Resources

The acquisition of 8,000 acre-feet of water per year from present agricultural users would retire about 2,300 acres of irrigated farm land. The location of lands that would be eliminated from irrigation is not currently known.

Using 8,000 acre-feet of water annually for industrial purposes could eliminate perhaps 2,020 acre-feet of irrigation return flow yearly to the Sevier River. This would also affect the quality of flows in the river, but impacts cannot be determined until the quantity of diverted water and the quality and location of the return flows are better known. It is likely that the elimination of return flows would result in a slight improvement (decrease) in the salinity of the Sevier River. There are no shallow water table aquifers at the proposed site. Sedimentation into local streams would be insignificant based on an analysis of soil characteristics and low erosion hazard. The magnitude and effects of increased sedimentation are not presently known.

Subsidence, which could occur following mining operations,

could reduce or eliminate surface discharges of water. The number of springs, flow rates, and potential usage are not known. In most cases, these waters are utilized for livestock production.

(6) Wildlife

Construction of the project facilities would cause no impacts to wildlife. The area is used mainly for livestock grazing.

Impacts on wildlife from the increased human population would be very similar to those of the Emery site.

(7) Cultural Resources

Although impacts are expected to be rather negligible, any increase in local and regional populations as a result of the proposed action would indirectly impact cultural resources in the primary influence zone (within a 2-hour driving distance). Increased cultural site visitation would indirectly subject all values to partial destruction or total loss to previously undisturbed archaeological sites. Table 8-10 represents an estimation of sites that could be affected by the project components. This estimate is based on existing data from areas surrounding the alternative site.

(8) Scenic Quality

Introduction of a massive industrial complex and associated facilities into the rural landscape would change the scenic character. Color, form, line, and texture would be changed by the clearing and grading, structures, roads, dumps, evaporation ponds, conveyor systems, and power lines not in harmony with the natural setting. The panoramic character of the landscape would permit a long viewing time along U.S.

Highway 89. The public may not be sensitive to the change because many would not consider the area scenically significant.

TABLE 8-10

Predicted Frequency of Occurrence of Cultural Sites
(Sevier Valley Alternative)

	Frequency[a]		
Project Component	High	Medium	Low
Generating Complex			X
Coal Source	---	---	---
Coal Transport			X
Transmission Lines			X
Work Force		X	
Overall Impact Rating			X

[a]High - 7 or more sites occur in area; Medium - 4 to 6 sites occur; Low - 3 or less occur.

(9) Land Use

The 2,000 acres of grazing land would be changed to industrial use. Use of 8,000 acre-feet of water from the Sevier River drainage plus loss of 2,020 acre-feet of return flow could require retiring up to 3,455 acres of irrigated crop land. This would reduce beef production equivalent to the annual consumption of about 820 people. The exact location of this impact is unknown.

Moderate impacts on existing recreational facilities within the primary influence zone would occur. Impacts would include occasional

overcrowding and deterioration of facilities and the natural environment. Severity and duration of impacts would be similar to those associated with the Emery proposal.

(10) Human Resources

Most of the new population would live in Richfield, Salina, and Gunnison. Needs of the new population would exceed the capacity of present facilities for health care, education, utilities, housing, and other community functions.

The highest total population would occur in the fourth year of construction. The population during the peak construction period would be 5,705; the population required to support the project should level off at 5,085.

New employment opportunities would create a need to recruit and hire from inside and outside the area. The labor force available locally is small, which would create competition for workers, and would probably reduce the number of workers in the services-related sector. (Due to competition, many service workers would accept higher paying construction jobs.)

Training is presently available locally for the mining and power plant industries at the Sevier Valley Technical College. The need for diversification of industry would not be a major problem as manufacturing plants already exist in the region. The project would generate about 1,040 construction jobs. Upon completion, the generating complex would provide approximately 850 operational and mining positions.

Taxes from the plant could dominate the entire Sevier and Sanpete county tax system. The project would create at least $670,000 in sales

tax revenues and at least $2.4 million annually in increased property taxes. City and county bonding capacity would increase rapidly.

The new population would face difficulties finding adequate housing. Some development is taking place in Richfield and additional development would be encouraged by the addition of new sewer lines. The demand for approximately 1,500 additional homes in the area would quickly consume available housing.

Organization of local government is not expected to change, but impacts on local government could be far-reaching. Officials may not be reelected, but replaced by newcomers employed by one of the energy-related companies. If newcomers arrive in sufficient numbers, their votes could dominate local governments.

Since water and waste systems in most of the communities are already being used to capacity, the patterns of development for housing would largely depend upon the construction of additional utility systems.

The school districts would need to construct new facilities for approximately 1,000 additional students (1,222 at peak). Total enrollment in 1970 was 3,076, thus 1,000 new students would represent more than a 30 percent increase. New facilities would probably be additions to present buildings. The influx of nearly 1,000 new students would demand at least 53 new classrooms and 55 new teachers.

Richfield and Salina presently require additional police officers and, depending upon settlement patterns, additional deputies in the Sheriff's Office. More highway patrol officers would also be needed. At least nine additional police officers would be needed to accomodate the power plant-related population.

Fire protection in Richfield, currently volunteer, would become inadequate. A permanent force would have to be hired and additional equipment purchased. The small communities are now adequately protected, although new equipment may be necessary.

The new hospital facilities in Richfield should be adequate for its growth; however, new personnel needs would be created. A full-time clinic in Salina would be desirable in order to provide quality health care to the outlying communities.

Changes in the quality of life would occur as the population increased. Impacts from increased urbanization would be obvious. Some aspects may improve with the increased availability of employment, goods, and services.

(11) Human Health and Safety

The traffic on US-89 would increase by 300 to 500 vehicles daily during the plant construction phase. During plant operation, traffic on US-89 and I-70 would increase to 288 trucks per day. Traffic increase on I-70 would have a minimum impact, but the coal trucks traveling along US-89 could produce a significant impact. The accident rate would probably be higher than the state average of 239 accidents with 0.43 fatalities per million miles driven. At least 105 traffic accidents with 1.8 fatalities would occur annually.

Mine and plant-related impacts would be similar to those discussed for the Emery proposal. Chapter 3 contains further information.

f. Mitigating Measures

(1) Authorizing Actions

Mitigating measures required of the applicant by federal, state, and local entities; as well as Company-committed mitigation that could be implemented at the Sevier site, are the same, and under the same authority, as those presented in Chapter 4 for the Emery site.

(2) Evaluation

(a) Soils

There is no practical way to mitigate the loss of soil productivity on about 1,500 acres occupied by project facilities.

Erosion would be reduced on disturbed areas by restoring the natural cover protecting the soil and reducing the velocity of surface runoff. The amount of erosion that would be reduced is unknown, but soils could be rehabilitated in from 5 to 10 years.

Mitigating measures required by federal agencies could be applied elsewhere; however, there is no indication the measures would be enforced on other than federal lands.

(b) Vegetation

Through mitigation on disturbed areas where vegetation is removed, the vegetative cover and production would be restored within 5 to 10 years on acreage with a low erosion hazard and with a greater than 50 percent chance of success for normal seeding.

(c) Cultural and Paleontological Resources

The Federal Government seeks to preserve and protect prehistoric

and historic cultural values from inadvertent damage or loss through field identification and evaluation surveys. Relocation of project components would be encouraged in order to avoid and protect archaeological resources. Salvage action would be a last resort after all other feasible means to preserve or protect a resource in its original condition and context have been explored.

The archaeological information must be submitted in an evaluative report to the authorized federal officer. Findings, suggested recommendations for mitigation, and evaluation of the archaeological resource must be contained in the report as outlined in Section 106 of the Historic Preservation Act, and in Section 2.b. of Executive Order 11593. The responsible federal agency would review the report recommendations to decide proper mitigation.

Any changes in alignment, adjustment, or relocation of the proposed facilities would also have to be surveyed. This procedure would protect sites not previously subject to direct impact, that may have become endangered as a result of route change or relocation of facilities.

The effectiveness of field surveys is limited by the skills of the evaluator. The survey can only be used to evaluate visible cultural data. If a buried site were discovered, the chance of federal representatives being on the scene would be slim. Consequently, the mitigating measure would be implemented at the discretion of the Company construction foreman.

Protection of archaeological and paleontological resources under State of Utah jurisdiction is improving through use of identification,

evaluation, and salvage operations. It is anticipated that some losses could continue to occur because of inadequate funding and manpower.

The Federal Antiquities Act of 1906 provides for the protection and preservation of vertebrate fossils of an actual historic or scientific interest, or of some unusual significance. Similarly, the National Environmental Policy Act (NEPA) of 1969 could be interpreted to include paleontological values under Section 101 (b). This section directs all federal agencies "to preserve important historic, cultural, and natural aspects of our National heritage...". In order to insure adequate protection and proper preservation, such measures as survey, evaluation, relocation, or salvage may be deemed necessary. Presently, the law would pertain only to federally-administered lands.

(d) Scenic Resources

Qualified field specialists from each federal agency involved should aid the applicant in preparation of a "construction plan" which would assist in assuring compliance to mitigating measures. The action must take place "on the ground" over the entire system site, assuring that visual contrasts would be reduced by revegetation, vegetative screening, restricted trimming, route selection, minimal soil disturbance, dust control on new construction, and selection of compatible paints or material colors for all structures.

The extent of mitigation cannot currently be ascertained. The mitigating measures are reasonable, and there are no compelling reasons why they could not be implemented.

Visibility and contrast would be reduced by tree trimming (but not complete removal of trees) near the power line and by the establishment

of buffer zones of vegetation adjacent to stream crossings. This would reduce visual impacts from line construction along the transmission lines. Although this type of mitigation has often been used, experience has revealed that lack of intensive federal agency supervision would reduce the effectiveness of this measure; unknown visual impacts could remain.

(e) Land Use and Human Resources

Mitigation of impacts to land use and human resources cannot be considered real and committed; the reason being that these mitigations cannot be established or enforced by those federal agencies now preparing the ES, who are involved in the federal actions (permits, leases, etc.) required for construction of the project.

(f) Human Health and Safety

The enforcement of traffic laws on US-89 would be difficult if the traffic volume increases since the highway patrol does not have the funds to hire additional patrol officers.

g. Unavoidable Impacts

Air pollution emissions would occur, resulting in limited air degradation and long-term deposition of small amounts of particulates, trace elements, and radioactive elements. The short-term acute impacts of these emissions are not expected to be significant. The long-term effects of deposition, transfer, and accumulation are currently unknown. The effects on visibility are expected to be low, based on emissions from similar plants in the Southwest.

Subsidence could occur on 4,000 to 5,000 acres on the Old

Woman Plateau, affecting surface and underground water flows. Subsidence following mining operations could intercept ground water aquifers above the mined areas. Springs (the number or flow is not known) could be affected with the possible loss of an unknown amount of surface discharge. The loss or reduction of surface discharge could affect livestock grazing and wildlife.

No measurable increase in erosion would occur on the 100 to 200 acres of soil disturbed during the construction phase. These areas would take from 5 to 10 years to rehabilitate, and during that time soil productivity would be lost. Soil productivity would be lost on about 1,500 acres for the life of the project.

Vegetative production for the life of the project would be lost on 1,500 acres occupied by project facilities. On another 100 to 200 acres disturbed during construction, vegetative production would be lost for 5 to 10 years until rehabilitation occurred.

Purchase of 8,000 acre-feet per year of agricultural water would eliminate irrigation on about 3,455 acres of land.

Legal restrictions imposed upon the increased recreational public to protect archaeological and paleontological sites in the primary influence zone would not be fully effective in alleviating losses which would occur. The degree, extent, and magnitude of adverse impacts on cultural resources are unknown.

Even with full implementation of proposed mitigative measures, damage and loss of value would still result to the cultural resources. With surveys being incomplete, the extent of loss is unknown. Damage would occur to subsurface values not discovered initially through field

inventory. Current limitations in location, recovery, and analytical techniques would result in the destruction of certain contexts and relationships between specimens and their environment during recovery operations proposed as mitigating measures. Removal of entire segments of the archaeological resource could seriously impair or prevent future opportunities for an unbiased scientific investigation.

The generating complex and associated facilities would introduce prominent visual features that would change landscape contrasts. These contrasts could be reduced, but not completely avoided. The change would be most noticeable to travelers on U.S. Highway 89.

The loss of 2,000 acres of livestock forage at the plant complex could not be avoided.

With present funding, impacts of overcrowding and deterioration of recreational facilities cannot be avoided. By adequate construction and maintenance of facilities, impacts would be virtually eliminated.

The construction workers and operation work force that would migrate to Sanpete and Sevier counties would, in turn, attract additional population. The increased population would create new service jobs which would add to the overall growth of the area.

The number of construction workers would fluctuate if the project were built and this could lead to some unemployment. The construction workers, the plant operators, and the miners all represent different employment groups. If the project were approved, there would be an element of continuing change in employment until construction was completed. The population increase would stabilize at 5,085 additional people upon project completion.

The population increase would have its greatest effect on housing. All available housing would be occupied, and a housing shortage could last for approximately 5 years. An estimated 1,500 new homes would be needed.

The organization of local government would not change although local elected officials could be displaced.

Demands placed on sewer and water systems would be beyond the capacities of the systems. Additional water and sewer systems have been built and more would have to be built to meet anticipated needs. New water and sewer facilities would be needed for the 1,500 homes projected.

Available space in the schools is currently being filled by an increasing population. Approximately 53 additional classrooms and 55 teachers would be needed in Sanpete and Sevier counties to accomodate the project-related growth.

Nine additional police would be needed. Police officers, however, may be difficult to hire since the salaries may not be competitive with mine and construction pay scales.

Highway accidents would probably continue to increase in proportion to the population growth.

All communities would need improved fire protection. Richfield would need a full-time fire department and additional equipment. Other communities would need equipment and volunteer firemen.

Population increases associated with the project would increase the need for two additional doctors and medical facilities.

A change in the quality of life would continue to occur as the

population increased. Impacts of urbanization would be obvious in a small community. The further availability of employment, goods, and services could improve some aspects, however.

4. Cedar Valley Site

a. Site and Plant Description

The Cedar Valley alternative site would be near the northeast corner of T. 3 S, R. 2 W, Utah County, Utah (lat. 40° 08' N, long. 112° 03' W), west of Goshen Pass, about 13 miles north of Elberta and 6 miles west of Utah Lake. Cedar Valley is a closed valley, having no natural storm runoff into any other basin (Figure 8-8).

d. Brief Discussion of Environment

Area wind records show prevailing winds in the area in a southerly direction. Mixing heights range from a morning average of 1,000 feet to above 7,000 feet in the afternoon, with average wind speeds in the mixing layer of 10 miles per hour (mi/h) in the morning and 12 mi/h in the afternoon. The worst diffusion conditions can be expected in winter when mixing heights and wind speeds are the lowest. Over a 5-year period, the area experienced 46 air pollution episodes for 2 days or longer (Holtzworth, 1972). This frequency is slightly greater than at the Emery site (40 episodes).

Cedar Valley is a relatively flat bowl surrounded by low mountains and hills. Several canyons or passes cut through the mountains. The major air drainage appears to be in a northern direction opening into Utah Valley on the northeast and into Rush Valley on the west, at Fairfield. No ambient air quality data are available for the site. The

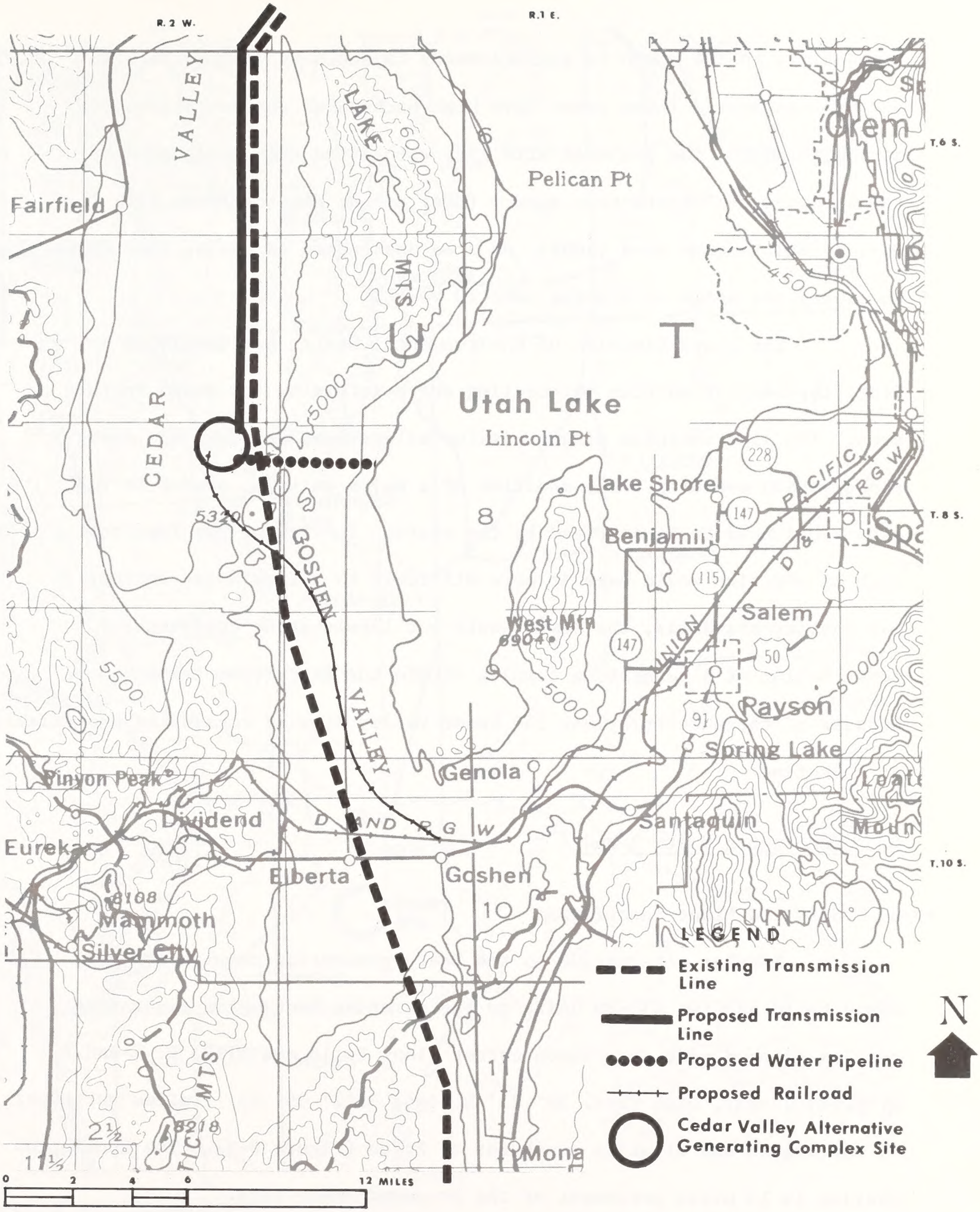


FIGURE 8-8

CEDAR VALLEY ALTERNATIVE GENERATING COMPLEX SITE

air quality to the north is significantly impacted by sources in Utah and Rush valleys. These areas have high background concentrations of air pollutants. The proposed site lies within the area designated by the Environmental Protection Agency (EPA) as the Wasatch Front Air Quality Maintenance Area (AQMA), an area designated as having the potential to exceed the NAAQS within the next 10 years.

The State Division of Environmental Health has developed a State Implementation Plan for meeting and maintaining the NAAQS in this area. The plan includes plant emission allocations and fuel and energy conservation measures. Any addition of a major emission source in the area would have to be approved by the state. In view of the fact that such an addition would make it more difficult to maintain the ambient air quality standards, the state would not likely grant approval for construction of a generating complex within the Emery time frame. Because of these restrictions the Cedar Valley site is considered unavailable at this time.

5. Huntington Units 3 and 4

a. Site and Plant Description

Another alternative to the Emery generating complex proposal would be to add two 430-MW units to the existing Huntington generating complex located near the common corner along T. 16 and 17 S, R. 7 and 8 E, Emery County, Utah (lat. 39° 23' N, long. 112° 05' W), 7 miles northwest of Huntington and 21 miles southwest of Price (Figure 8-9). The Huntington Station is 13 miles northwest of the proposed Emery site.

The Huntington generating complex has been designed to allow

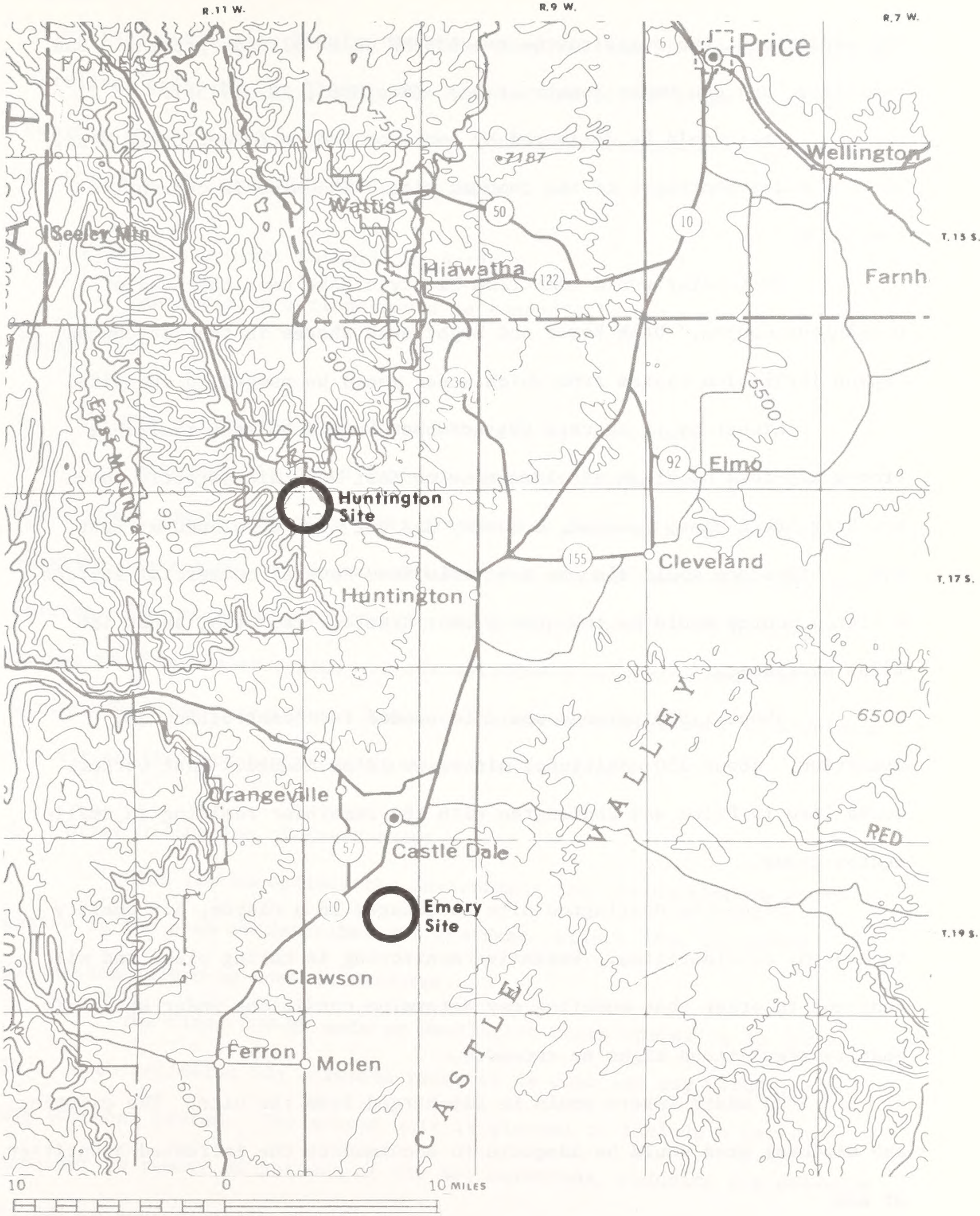


FIGURE 8-9

HUNTINGTON AND EMERY SITES

the addition of two units to the two 430-MW units already present - one completed, and one under construction. (See USDI, BR, 1975a).

Coal would be delivered by conveyor from the Deer Creek Mine, about 2 miles southwest of the complex site. The mine is currently operating.

Most water would come from Electric Lake near the head of Huntington Canyon. Utah Power and Light owns shares in the Cottonwood Canyon irrigation system from which water could be pumped to the site.

Limestone to operate SO_2 scrubbers could be made available from a cap-rock of Flagstaff limestone on East Mountain directly above the Deer Creek Mine; however, a quarry has not been developed at that site. Limestone would also be available from several commercial sources. A likely source would be the quarry near Grantsville, Utah, about 180 miles northwest.

About 1,090 persons would be needed for construction and operation. About 250 additional miners would be needed. Most workers would live in Price and Huntington with the remainder residing in smaller nearby towns.

Since the Huntington site is located in a canyon, air quality is a major consideration. Extensive monitoring is taking place and will continue in order that modeling may determine conditions under which air quality regulations might be exceeded.

No waste waters would be discharged from the site. The existing ash disposal area would be adequate to accommodate the increased quantities of ash.

Parts of the transmission line corridors exist from the Huntington

generating complex to Spanish Fork and Camp Williams. Transmission line corridors exist to the Sigurd substation. New 345-kV lines would be constructed in these corridors. The transmission lines proposed would be identical to those for the Emery site.

b. Federal and Other Authorizing Actions

Authorizing actions would be essentially the same as for the Emery site.

c. Interrelationships with Other Projects and Proposals

Interrelationships would be essentially the same as for the Emery power plant. However, this alternative adds units to an already existing plant about which two environmental impact statements have been written. The major area of concern would be air quality in Huntington Canyon and field measurements of air pollutants have been made under actual operating conditions. These measurements can be used in assessing the air quality impacts if units 3 and 4 were added.

d. Brief Discussion of Environment

With few exceptions the environment for the Huntington alternative is the same as described for the Emery plant. The following discussion points up some differences.

The first 430-MW unit at Huntington began operating in April 1973, with estimated SO_2 emission rates of 44 tons per day without an SO_2 scrubber system. The second unit is planned to include a wet lime scrubber to remove 80 percent of the SO_2 emissions, reducing the emission of SO_2 to approximately 9 tons per day or to a total of 53 tons per day for both units. Together, both units will emit approximately 5.3 tons

per day of particulates after 99.5 percent particulate control, using worst-grade coal. Nitrogen oxide emissions will be approximately 68 tons per day for both units.

Measurements of ground level concentrations of SO_2, NO_x, and particulates have been made by the University of Utah Research Institute (UURI, 1975) both before and after the beginning operation of the first unit. Air sampling stations were established in a side canyon to Huntington Canyon (Bear Creek) about 2 miles above the power plant and at other stations in the Castle Valley area east of the plant. Results of the sampling at the Bear Creek station are shown in Table 8-11. The Bear Creek Canyon station is adjacent to valley area stations. Higher levels of NO_x were recorded at the valley stations, but were attributed to auto exhaust emissions.

Coal for units 3 and 4 would come from the Deer Creek Mine. Coal would be mined from the Wilberg leases but would be moved through the Deer Creek portal. (Chapter 2 gives a more complete description of the geology and topography of the area.)

At the Huntington generating complex, the soils at the sites for units 3 and 4 have already been disturbed. The site is currently being used for a lay-down area for construction of the second unit.

Linear facilities, such as transmission lines and roads, would be similar to those of the Emery proposal since the same corridors would be involved. However, there would be no requirement for a coal haul road. (Chapter 2 contains a more detailed discussion of soils within the corridors.)

The vegetation has been removed from the construction site

TABLE 8-11

Sampling Result - Bear Creek Canyon Station
(July and December 1973; January 1974)

Pollutant	Measured Ground Level Concentrations ($\mu g/m^3$)	(p/m)	Factor Increase Over Background	Emission Rate (ton/day)	Percent[a] of Allowable Standard
Sulfur Dioxide					
Average	13	0.005	7	44	16
24-hour Maximum	27	0.01	12	--	7
Nitrogen Dioxide					
Average	13	0.007	7	68	13
24-hour Maximum	19	0.01	10	--	--
Particulates					
Average	[b]0.43	-----	--	1.4	---[c]

Source: UURI, 1975

[a]National Ambient Air Quality Standards (NAAQS) apply.

[b]0.43 $\mu g/m^3$ increase in fly ash concentrations when plant was operating, compared to times when plant was not operating.

[c]Due to the impact of local sources of wind blown dust, the primary NAAQS 24-hour standard (260 $\mu g/m^3$) was exceeded six times during the year at the station at Huntington. The secondary 24-hour standard (150 $\mu g/m^3$) was exceeded 48 times and the annual geometric means particulate concentration exceeded the primary NAAQS (75 $\mu g/m^3$) every month except January. The federal primary 24-hour standard (260 $\mu g/m^3$) was never exceeded at Bear Creek station, and the secondary 24-hour standard (150 $\mu g/m^3$) was exceeded only twice. Annual geometric mean was 21.3 $\pm$ 3.0 $\mu g/m^3$.

also to provide a laydown area for construction of units 1 and 2.

Vegetation along the transmission line and access road is similar to that of the Emery project as the same corridors would be involved. (Chapter 2 discusses vegetation in more detail.)

Electric Lake, a storage reservoir on Huntington Creek, could supply 8,000 acre-feet of water per year - water which is already appropriated by UP&L for electric power generation purposes.

The complex, coal mine, water supply, and coal conveyor system already exist at the Huntington site.

Wildlife associated with the transmission line and access road would be similar to that of the Emery proposal since the routes would be the same. (Chapter 2 contains a detailed study of wildlife along these corridors.)

The site has been prepared for this alternative. Apparently, no cultural or paleontological resources exist at the site. Because of the close proximity of the Huntington and Emery sites, the nonsite-specific cultural resource extends over the same area within a 2-hour driving distance from Price, Utah.

Inasmuch as the transmission lines for the Huntington alternative would be the same as for the proposal, the cultural resources along the proposed transmission line would be the same as at Emery.

The landscape characteristics of the overall area are common to the semiarid Colorado Plateau of central Utah. The overall impression conveyed by the area is one of a dramatically sculptured canyon and panoramic desert landscape. The clarity of the air for viewing scenery would be considered very good, even with one unit in operation. Major

scenic attractions include the San Rafael Swell, Manti-La Sal National Forest, and state recreation areas.

The landscape at the complex itself is a semienclosed canyon bench with colorful sandstone escarpment rising steeply to high mountain plateaus with high man-made contrast (Figure 8-10).

The land area for units 3 and 4 is already under UP&L ownership and further acquisition is not necessary. Land use is currently industrial, therefore, no changes would occur if this alternative were implemented.

No recreational resources exist on the site. However, the nonsite-specific recreational resource extends over the same area as the Emery proposal. It includes the Price-Helper and western Emery County towns, Manti-La Sal National Forest, and national resource lands under BLM administration. (Chapter 2 contains a more complete description of recreational use areas.)

The existing social environment for the Huntington alternative would be the same as described for the proposed Emery generating complex.

e. Environmental Impacts

Assuming a linear relationship between estimated emission rates and ground level concentrations of pollutants, the estimated ground level concentrations of SO_2, NO_x, and particulates for 860, 1,290, and 1,720 MW, with scrubbers on Units 1, 3, and 4, are shown in Table 8-12. It would appear from these preliminary calculations that with 99.5 percent particulate removal and 80 percent SO_2 removal on units 1, 3, and 4, the resulting emissions from four units at the Huntington site would not exceed the NAAQS.

It must be recognized that these calculations are preliminary,

FIGURE 8-10

SEMIENCLOSED CANYON AT HUNTINGTON
WITH HIGH MAN-MADE CONTRAST

TABLE 8-12

Estimated Ground Level Emission Concentrations and Particulates

Pollutant	Unit 2 only [a]430 MW Emission Rate (Ton/d)	Unit 2 only [a]430 MW Concentration ($\mu g/m^3$)	Unit 1 & 2 [b]860 MW Emission Rate (Ton/d)	Unit 1 & 2 [b]860 MW Concentration ($\mu g/m^3$)	Unit 2, & 3 [c]1,290 MW Emission Rate (Ton/d)	Unit 2, & 3 [c]1,290 MW Concentration ($\mu g/m^3$)	Unit 2, 3, & 4 [d]1,720 MW Emission Rate (Ton/d)	Unit 2, 3, & 4 [d]1,720 MW Concentration ($\mu g/m^3$)	Concentration Limitation of Class II Area ($\mu g/m^3$)	Percent of Allowable Increase
Sulfur Dioxide										
Average	44	13	53	16	62	18	71	21	15	[e]33
24-Hour Maximum	44	27	53	32	62	38	71	44	100	12
Nitrogen Dioxide										
Average	68	13	136	26	204	39	272	52	100 (Class III)	52
24-hour Maximum	68	19	136	38	204	57	272	76	none	--
Particulate										
Average	1.4	0.43	2.8	0.86	4.2	1.29	5.6	1.72	[f]10	9

[a]Assumes 99.5 percent particulate control, no NO_x control or SO_2 control.

[b]Assumes 99.5 percent particulate control, no NO_x control and 80 percent SO_2 control on unit 1.

[c]Assumes 99.5 percent particulate control, no NO_x control and 80 percent SO_2 control on units 1 and 3.

[d]Assumes 99.5 percent particulate control, no NO_x control and 80 percent SO_2 control on units 1, 3, and 4.

[e]Emissions from units 1 and 2 are considered part of the background and not counted against the allowable increase under the Prevention of Significant Deterioration Regulations.

[f]The allowable particulate increase limitation is for total particulates.

based on estimated data, and that the assumption was made that the single site of Bear Creek Canyon would receive the highest ground level concentrations.

As coal would be mined for units 3 and 4 from the Wilberg Mine leases, impacts resulting from subsidence would be similar to those described in Chapter 3 for the Emery site.

Since the soils at the Huntington site have been disturbed in preparation for units 1 and 2, no additional impacts are anticipated. Impacts to soils along the transmission line routes and above the Wilberg Mine where subsidence could occur would be similar to those described for the proposed action.

Since the site for this alternative has already been cleared, no further impacts to vegetation are expected. Impacts to vegetation along the transmission route would be similar to those described under the proposed action.

Water needed for this alternative has already been appropriated and impoundments and pipe line installed. Thus, no additional impacts are anticipated. However, impacts to water resources along the transmission line and above the Wilberg Mine where subsidence could occur would be similar to those of the proposal as described in Chapter 3.

Since wildlife has already been displaced from the site, no additional impact would occur. Impacts to wildlife along the transmission line route would probably be similar to those described for the proposed action.

The Huntington alternative would not cause any impacts to cultural resources. Impacts due to the building of linear facilities,

such as transmission lines and roads, would be the same as for the Emery proposal. They would follow the same routes and would involve the same construction activities. (Chapter 3 contains a more complete description of these impacts.)

Nonsite-specific damage due to vandalism or inadvertent destruction of cultural resources would occur over the same area and in the same degree as for the proposed Emery project. However, the full extent is unknown.

Development of two more units would introduce additional prominent visual features into a landscape already extensively impacted by man-made development. The visual impact of changes in contrast at the complex would not be a substantial departure from the existing industrial and agricultural character of the landscape.

The roads and transmission corridors would create the same visual contrast change as the Emery proposal since the routes and structures would be the same as described in Chapter 3.

This alternative would not impact any land use on the site. Impacts on recreation would be the same as those described for the proposed project in Chapter 3.

Approximately the same amount of water would be used for units 3 and 4 as for Emery. Similar agricultural lands would be involved. Therefore, impacts to agriculture would be the same as described for the proposal in Chapter 3.

If the impacts on human resources as described for the Emery power plant were transferred to Huntington units 3 and 4, the effects would be the same.

f. Mitigating Measures

Mitigating measures required of the applicant by federal, state, and local entities; as well as the applicant committed mitigation that could be implemented at the Huntington site are the same as for the Emery site. The measures would come under the same authority as those presented in Chapter 4 for the Emery site. Evaluation of these mitigating measures would also be identical.

g. Summary of Unavoidable Adverse Impacts

There would be some degradation of air quality. However, the short-term effects would not be expected to be significant. Additional studies need to be made to determine whether there would be any long-term effects.

Unavoidable subsidence impacts would be the same as those described for the Wilberg Mine in Chapter 5.

Soil impacts would likely occur at the coal source and transmission lines as described in Chapter 5.

Impacts on vegetation would be similar to those described for the Emery transmission line in Chapter 5. However, the 800 acres of agricultural land and 1,200 acres of grazing land affected at the proposed complex would not be affected by the Huntington alternative. Also, 12 acres of agricultural land that would be lost from construction of the coal haul road at the proposed site would not be lost at the Huntington site.

Impacts on water would be the same as those described for the Emery project in Chapter 3. However, drainage water, such as that which would flow into Rock Creek at the Emery site, would not be generated by the Huntington alternative.

Unavoidable impacts on wildlife species and habitat would be similar to those described in Chapter 3 for the proposed action, with the exception that pheasant habitat lost at Emery would not be lost at Huntington.

Despite the implementation of proposed mitigating measures, some damage or destruction of cultural and paleontological sites would occur. There is no way to predict the extent of damage.

The industrial intrusion and visual contrast at Huntington would be expanded and could not be completely mitigated, nor could all man-made changes in contrast along linear facilities.

Unavoidable impacts on land use and recreation would be nearly the same as described for the Emery proposal. However, agricultural land impacted is being served by the Huntington Cleveland Irrigation Company. The UP&L owns sufficient water rights in Huntington Creek and would not be required to pay for its use as would be the case at Emery. It is not likely that improved irrigational practices and water management would be implemented.

Some overcrowding and damage to recreational facilities would occur over the short term (up to 10 years). There should be no long-term unavoidable impacts to recreational facilities.

Unavoidable impacts on human resources, health, and safety at the Huntington alternative could be the same as at the Emery site (Chapter 5).

6. Little Mountain

a. Site Description

The Little Mountain alternative site is located in section 7,

T. 6 N, R. 3 W, Weber County, Utah (lat. 41° 16' N, long. 112° 13' W), about 13 miles west of Ogden, on Little Mountain, a saddle-shaped mass of sedimentary rock protruding above the mud flats on the east shore of the Great Salt Lake.

b. Brief Discussion of the Environment

Wind records from Salt Lake City and Ogden show a strong predominance of southeasterly winds, and since there are no significant terrain obstacles separating Little Mountain from those cities, the same wind regime should prevail. During a 5-year period there were 46 air pollution episodes in Salt Lake City for 2 days or longer (Holtzworth, 1972). This frequency is slightly greater than the 40 air pollution days recorded at Emery during a similar 5-year period. The ambient air quality for the area surrounding the Little Mountain site would be considered poor. A number of large industrial pollution sources in the Salt Lake City-Ogden area contribute to this poor air quality. Both the federal primary and secondary ambient air quality standards for particulates and SO_2 are sometimes exceeded.

The proposed site, like the Cedar Valley alternative, lies within the area designated by the EPA as the Wasatch Front Air Quality Maintenance Area (AQMA). The AQMA are areas identified as having the potential of exceeding air quality standards within the next 10 years. The State Implementation Plan has outlined a control strategy for attaining and maintaining the NAAQS. Therefore, this site should not be considered as a realistic alternative because it is located in a state air quality maintenance area. The same reasons apply for this site as described for the Cedar Valley site.

7. Summary

This section provides the reader with a means of comparing the impacts of alternate plant sites on the various resources. It also summarizes the relative importance of the resources being affected. A series of matrices have been used to show the relationships.

Tables 8-14 through 8-24 show alternative plant site impacts on individual environmental components.

Each alternative site (Sevier, etc.) was weighed against each of the important features or "variables" (dispersion conditions, etc.) for each environmental component (air quality, etc.). An impact ranking was then listed for the environmental component under each alternative generating plant site. See Table 8-14, Air Quality, for an example.

The following rankings were used in all comparisons:

0 = No impact would occur.

1 = Low impact would be expected.

2 = Medium impact would be expected.

3 = High impact would be expected.

The "Impact Summary Rating" shown on the botton line (see example Table 8-14) is the sum of the column of numbers under each alternative divided by the number of "variables" listed on the left side of the table.

Table 8-13 displays a summary of the impact(s) for each alternative plant site on all environmental components, a relative importance factor for each component, and an "impact score". A total impact score was provided for comparing the environmental impacts of each alternative plant site.

The "impact rating" of each plant site on an environmental component was taken from the botton line on each of the Tables 8-14 through 8-24.

The "importance factor" was arrived at by an interdisciplinary team. Three conditions were considered: Relative quality of the resource, amount of public concern for the resource, and level of public controversy over the potential impact of a power plant on the resource. Environmental components were assigned one of five factors ranging from "least important" (1), to "most important" (5). (See footnote on Table 8-13.)

The "impact score" is the result of multiplying the "importance factor" by the "impact rating".

The "total impact score" is the sum of the impact scores listed under each alternative plant site. Plant sites having highest total impact scores appear to have the greatest overall environmental problems.

Total impact scores could be used by the decision maker, along with other factors, in deciding the relative merits of the alternative site.

TABLE 8-13

Summary Environmental Impact Rating

		Component Impact Rating							
		Garfield West		Garfield East		Sevier		Huntington	
Importance Factor[a]	Environmental Component	Impact Rating[b]	Impact Score	Impact Rating[b]	Impact Score	Impact Rating[b]	Impact Score	Impact Rating[b]	Impact Score
5	Air Quality	2	10	2	10	2	10	2	10
1	Geology	1	1	1	1	1	1	1	1
2	Soils	2	4	2	4	1	2	1	2
3	Vegetation	3	9	3	9	2	6	2	6
4	Water	2	8	2	8	1	4	1	4
2	Wildlife	2	4	2	4	1	2	2	4
3	Cultural	2	6	2	6	1	3	2	6
4	Scenic	2	8	3	12	2	8	1	4
2	Land Use	1	2	1	2	1	2	1	2
4	Human Resources	3	12	3	12	2	8	2	8
1	Human Health and Safety	1	1	1	1	1	1	1	1
Total Impact Score			65		69		47		48

[a]Importance Factor
1=Least Important
2=Somewhat Important
3=Important
4=Very Important
5=Most Important

[b]0=None
1=Low
2=Medium
3=High

The impact score is derived from the following formula:
(Importance Factor) x (Component Impact Rating) = Impact Score.

TABLE 8-14

Air Quality

Variables	Impact Ranking				
	Garfield West	Garfield East	Sevier	Huntington	Emery
Dispersion Conditions[a]	2	3	3	2	2
Elevated Terrain[b]	3	3	3	3	2
Adverse Terrain Effects[c]	2	3	3	2	2
Stagnation Episodes[d]	3	3	3	1	1
Parks and National Monuments[e]	3	3	1	2	2
Existing Air Quality[f]	2	2	2	3	2
Other Emission Sources[g]	1	1	1	3	2
Human Population[h]	1	1	2	2	2
Impact Summary Rating	2	2	2	2	2

[a] Dispersion Conditions - The poorer the dispersion condition, the higher the ranking.

[b] Elevated Terrain - Elevated terrain could act to prevent dispersal during stagnation periods. Therefore, the closer the elevated terrain, the higher the ranking.

[c] Adverse Terrain Effects - The higher the probability of mountain downwash, drainage from surrounding higher terrain, etc. that would adversely affect plume dispersal, the higher the ranking.

[d] Stagnation Episodes - The higher the potential for stagnation to occur, the higher the ranking. Generally speaking, sites surrounded by mountainous terrain would be most susceptible.

[e] National Parks and Monuments - The closer to National Parks and Monuments, the higher the ranking. These areas have the potential for designation to Class I under the Prevention of Significant Deterioration Regulations.

[f] Existing Air Quality - The poorer the air quality that currently exists, the higher the ranking. Further degradation would approach or exceed air quality standards.

[g] Other Emission Sources - The greater number of emission sources and the proximity of other emission sources to the project, the greater the potential for cumulative effect; therefore, the greater the ranking.

[h] Human Population - The greater the population and the proximity of the population to the site, the higher the ranking.

TABLE 8-15

Geology and Topography

Variables	Impact Ranking				
	Garfield West	Garfield East	Sevier	Huntington	Emery
Subsidence[a]	1	1	2	2	2
Landslide Potential[b]	1	1	0	0	0
Impact Summary Rating	1	1	1	1	1

[a]Subsidence - The greater the potential for surface damage (structures and surface water) and subsurface damage (aquifers), the higher the ranking.

[b]Landslide Potential - If facilities are located on or near unstable areas and the possibility exists for landslides to be started or aggravated, the higher the ranking.

TABLE 8-16

Soils

Variables	Impact Ranking				
	Garfield West	Garfield East	Sevier	Huntington	Emery
Soil with High Erosion Hazard Disturbed at Generating Complex[a]	1	1	0	0	1
Soil Disturbed with a Less Than 50 Percent Probability for Seeding Success at Generating Complex[b]	2	2	1	0	2
Damage to Soil from ORV Use[c]	2	2	2	2	2
Impact Summary Rating	2	2	1	1	2

[a]Soil with High Erosion Hazard Disturbed at Generating Complex - The more acreage disturbed of this highly erosive soils, the higher the ranking.

[b]Soil Disturbed with a Less Than 50 Percent Probability of Seeding Success at Generating Complex - The more soil, (acreage) that is disturbed and has less than a 50 percent chance to be reseeded, the higher the ranking.

[c]Damage to Soil from ORV Use - The smaller the current use is, due to low existing populations, the greater percentage of increased damage that would occur from the additional population, and the greater the ranking.

TABLE 8-17

Vegetation

Variables	Impact Ranking				
	Garfield West	Garfield East	Sevier	Huntington	Emery
Threatened and Endangered Plant Species[a]	3	3	2	3	3
Damage to Vegetation from ORV Use[b]	3	3	2	3	2
Vegetation Removed at Generating Complex[c]	1	1	1	0	1
Riparian Vegetation[d]	3	3	1	0	2
Impact Summary Rating	3	3	2	2	2

[a]Threatened and Endangered Plant Species - The greater the number of threatened and endangered plant species found within the surrounding area, the higher the ranking.

[b]Damage to Vegetation from ORV Use - The smaller the current use is, due to low existing population, the greater percentage of increased damage that would occur from the additional population and the greater the ranking.

[c]Vegetation Removed at Generating Complex - The more acreage of vegetation that would be lost due to building the complex, the higher the ranking.

[d]Riparian Vegetation - The more acreage of this type of unique vegetation that would be lost from building the complex and ancillary facilities, the higher the ranking.

TABLE 8-18

Water

Variables	Impact Ranking				
	Garfield West	Garfield East	Sevier	Huntington	Emery
Sediment and Turbidity[a]	2	2	1	0	1
Change in Chemical Quality[b]	2	2	1	0	0
Mercury Hazard[c]	2	2	1	1	1
Ground Water Contamination[d]	3	3	1	1	0
Loss of Surface Discharge through Subsidence[e]	2	2	2	3	3
Impact Summary Rating	2	2	1	1	1

[a] Sediment and Turbidity - The greater the chance for sediment and turbidity to be generated, the higher the ranking.

[b] Change in Chemical Quality - The more the quality could be changed, that is TDS increased, the higher the ranking. Quality can also be decreased by contamination of untreated waste water.

[c] Mercury Hazard - The greater the chance of mercury contaminating the water supply, the higher the ranking.

[d] Ground Water Contamination - The more likely the chance of contaminating the ground water from construction and operation of the complex and mine, the higher the ranking.

[e] Loss of Surface Discharge through Subsidence - The greater the subsidence and the number of springs over the coal mine, the higher the ranking.

TABLE 8-19

Wildlife

Variables	Impact Ranking				
	Garfield West	Garfield East	Sevier	Huntington	Emery
Upland Game Birds[a]	0	0	0	0	3
Harassment[b]	3	3	2	2	2
Deer Winter Range[c]	3	3	2	3	3
Elk Winter Range[d]	0	0	0	3	3
Deer Fawning or Elk Calving Areas[e]	3	3	0	3	3
Water Source[f]	2	2	0	0	0
Impact Summary Rating	2	2	1	2	2

[a]Upland Game Birds - The greater the loss (acreage) of habitat, the higher the ranking.

[b]Harassment - This is based on current population and the percent of increase within the area as a result of the project. The smaller the current population, the greater the impact from the project within the area and the higher the rankings

[c]Deer Winter Range - The more acreage or miles that would be affected, therefore increasing the chance for disturbance, the higher the ranking.

[d]Elk Winter Range - Same as deer.

[e]Deer-Fawning or Elk-Calving Areas - Same as winter range.

[f]Water Source - The more important water is, either through scarcity or high dependence, the greater the risk of loss through subsidence, the higher the ranking.

TABLE 8-20

Cultural Resources

Variables	Impact Ranking				
	Garfield West	Garfield East	Sevier	Huntington	Emery
Cultural[a]	3	3	1	2	2
Paleontological[b]	1	1	1	1	1
Impact Summary Rating	2	2	1	2	2

[a]Cultural - The greater the possibility for damage or loss of resources, the higher the ranking.

[b]Paleontological - The greater the possibility for damage or loss of resources, the higher the ranking.

TABLE 8-21

Scenic Resources

Variables	Impact Ranking				
	Garfield West	Garfield East	Sevier	Huntington	Emery
Visibility[a]	2	3	3	1	2
Contrast[b]	2	2	2	1	2
Impact Summary Rating	2	3	2	1	2

[a] Visibility - The more easily an object can be seen from major areas of human activity, i.e. roads, scenic overlooks, and recreational areas, the higher the ranking.

[b] Contrast - The more the generating complex or ancillary facilities conflict or do not blend with the background scene or the expectations of the observer, the higher the ranking.

TABLE 8-22

Land Use

Variables	Impact Ranking				
	Garfield West	Garfield East	Sevier	Huntington	Emery
Agriculture[a]	1	1	2	2	2
Recreation[b]	2	2	1	1	1
Land Use Plans[c]	1	1	1	1	1
Impact Summary Rating	1	1	1	1	1

[a]Agriculture - The more land (acreage) taken out of production, the higher the ranking.

[b]Recreation - The smaller the current population and the area's inability to provide recreational opportunities, the higher the ranking.

[c]Land Use Plans - The more the construction of the alternative would conflict with local land use plans, policies, and goals, the higher the ranking.

TABLE 8-23

Human Resources

Variables	Impact Ranking				
	Garfield West	Garfield East	Sevier	Huntington	Emery
Short-term Shortage in Economic Base[a]	3	3	2	1	1
Housing[b]	3	3	3	2	2
Government[c]	3	3	2	2	2
Community Service[d]	3	3	2	2	2
Education[e]	3	3	2	2	2
Public Safety[f]	3	3	2	2	2
Public Health[g]	3	3	2	2	2
Goods and Services[h]	2	2	2	2	2
Quality of Life[i]	3	3	3	2	2
Impact Summary Rating	3	3	2	2	2

[a]Short-term Shortage in Economic Base - This is based on the size of the current economic base. The smaller the current base, the more difficult time the local counties and towns will have in providing short-term needs, therefore, the higher the ranking.

[b]Housing - The greater the potential for a shortage in housing to develop, should the project be built, the higher the ranking.

[c]Government - The greater the likelihood for old time local residents to lose control of local government, the higher the ranking.

[d]Community Service - The greater the lack of sewer and water systems, the higher the ranking.

[e]Education - The greater the percentage of school children population in the county that would be attributed to the project, the higher the ranking.

[f]Public Safety - The greater the percentage of fire and police protection that would be needed, over the existing situation, the higher the ranking.

[g]Public Health - The greater the percentage of new doctors, over existing numbers, that would be needed and the greater the percent increase in funds needed for new medical facilities, the higher the ranking.

[h]Goods and Services - The more difficult it would be for local businesses to provide these needs during construction and for five years following, the higher the ranking.

[i]Quality of Life - The more likelihood that existing local life styles would change as a result of the project, the higher the ranking.

TABLE 8-24

Human Health and Safety

Variables	Impact Ranking				
	Garfield West	Garfield East	Sevier	Huntington	Emery
Traffic[a]	1	1	2	1	1
Transmission Lines[b]	0	0	0	1	1
Mines[c]	1	1	1	1	1
Construction[d]	1	1	1	1	1
Impact Summary Rating	1	1	1	1	1

[a]Traffic - the more difficult it would be to accommodate the increased traffic that would result from the project on existing roads, the higher the ranking.

[b]Transmission Lines - If lines cross urban or suburban areas a higher ranking is given.

[c]Mines - The greater accident likelihood, the higher the ranking.

[d]Construction - The same as for the mine.

C. ALTERNATIVE PLANT DESIGN AND OPERATING METHODS

1. Sulfur Dioxide Removal Versus Nonremoval

Based on the statement from UP&L at the initiation of the preparation of the Impact Statement (January, 1976) that their Emery Power Plant Proposal was without flue gas desulfurization (FGD), BLM proceeded with analyses of impacts (Chapter 3) without sulfur dioxide control. Because of events that occurred in February and March 1976 stated in the chronological listing below, BLM requested from the State of Utah their position on emission controls that would be required at the Emery Power plant. Based on the State's response (April, 1976), the analyses of impacts without sulfur dioxide control continued, with the alternative of sulfur dioxide control and its impacts considered in this chapter. Although UP&L has now ordered FGD equipment, it has restated in its comments to the Emery DES (September, 1976) that its proposal for the Emery plant remains without FGD. (See comment letter Number 14 in Chapter 9.) Utah Power and Light has recently filed a petition for review in the United States Circuit Court of Appeals, District of Columbia, for a decision on the applicability of Prevention of Significant Deterioration Regulations (PSDR) to the Emery Power Plant without FGD.

The Emery Power Plant Proposal was approved for construction by the State of Utah, based on 80 percent FGD, on the 12th of December, 1973. On-site construction of the power plant commenced on April 19, 1975. The Emery Draft Environmental Statement (DES) was begun on January, 19, 1976, and considered the proposal with no FGD as directed by UP&L. The Emery DES was filed with the Council on Environmental Quality (CEQ) on August 3, 1976. The chronological sequence of events pertaining to

the FGD question for the Emery plant is outlined below:

a. Emery Environmental Analysis Report by UP&L (Volume 1, October 1973, Revised December 1973). Proposed 80 percent FGD.

b. Emery Power Plant Proposal concept approval and construction permit given to UP&L by the State of Utah December 12, 1973 (Appendix I-I). The proposal included 80 percent FGD.

c. Emery Generating Station Applicant's Environmental Analysis Addendum - UP&L submission August 1974, stated "SO_2 removal equipment will be installed as required to meet State and Federal emission standards."

d. Prevention of Significant Air Quality Deterioration Regulations (PSDR) promulgated by EPA on December 5, 1974, effective January 1975, for sources (including Fossil Fuel Steam Electric Plants of more than 1,000 x 10^6 BTU/hr heat input) which had not commenced construction or expansion prior to June 1, 1975.

e. Analysis of the Emery proposal by Voorheis, Trindle, and Nelson (VTN) (consultants under contract with BLM), submitted to BLM February 1975, discussed a sulfur dioxide removal system (wet scrubber) as part of the applicant's proposal.

f. Utah State Air Conservation Regulations, revised July 9, 1975, removed the requirement for 80 percent FGD requirement for new emission sources and replace the requirement with paragraphs 1.3 (Air Quaility Degradation Regulated) and 1.7 (Requirements of Pollution Control Equipment Specified).

g. The BLM, Emery Environmental Statement Team began work on the preliminary Draft on January 19, 1976. The Company (UP&L) advised the Emery ES Team Leader that their proposal did not include FGD.

h. Letter from UP&L to EPA Region VIII February 4, 1976 indicating their intention to submit a formal application to the Air Conservation Committee for approval of plans and specifications deleting the sulfur removal equipment from the Emery plant which was under Construction (Appendix I-9).

i. BLM letter to the Utah Air Conservation Committee requesting their position on emission controls required for the Emery Power Plant, March 4, 1976 (Appendix I-3).

j. Letter from EPA Region VIII to UP&L March 10, 1976 indicating that the proposal to eliminate the scrubbers from the Emery Units would constitute a modification and subject the plant to the requirements of the PSDR (Appendix I-10).

k. State of Utah, Division of Environmental Health, Bureau of Air

Quality (Dr. Grant S. Winn) response to Item 9, April 1, 1976, which stated "At this time, flue gas desulfurization units (scrubbers) are not required for the Utah Power and Light Company's Huntington #1, and Emery #1 and #2 coal-fired steam electric generators" (Appendix I-4).

l. The study, "Re-evaluation of the Potential Air Quality Impact of the Emery plant", was completed by North American Weather Consultatns in April 1976 for Utah Power and Light and considered from one to eight 400 MW units for the Emery plant with and without SO_2 scrubbers.

m. EPA comments on Draft EIS for Emery power plant June 25, 1976, indicated that the State of Utah did not receive a request from UP&L to eliminate the 80 percent controls originally agreed to by the Company. The comments further state that the PSDR do not apply, only if the units are constructed in accordance with the original state permit, i.e., with 80 percent control.

n. Telephone request by BLM (Richfield Air Quality Specialist) on June 25, 1976 to Enforcement Division, EPA Region VIII for EPA position on applicability of PSDR regulations to the Emery power plant.

o. EPA affirmative response to BLM phone request (June 25, 1976) dated June 30, 1976 which referenced UP&L letter to EPA Region VIII February 4, 1976.

p. Air Quality Study begun July 2, 1976 by H. E. Cramer Co. under contract with BLM to analyze the impacts of Emery and Emery plus Huntington power plants. H.E. Cramer study consider three cases: (1) No FGD on Emery #1 or Emery #2; (2) FGD on Emery #1, none on Emery #2; and (3) FGD on Emery #1 and #2. Study was completed August, 1976.

q. Emery Draft ES filed with CEQ on August 3, 1976. Proposal analyzed was with no FGD. FGD considered in Chapter 8, Alternatives, and has been continued in this FES.

r. UP&L comments on the Emery DES (September 18, 1976 [Letter Number 14, Chapter 9]) indicated that the Company's proposal remains unchanged and is to operate the units without such equipment [SO_2] removal).

s. State of Utah, Division of Health comments on Emery DES (September 20, 1976) indicated that UP&L had ordered sulfur dioxide scrubbers from Chemico Air Pollution Company. The comments also indicated that the proposal previously approved (with 80 percent scrubbing) was still in effect.

t. UP&L petitioned for review, in the United States Circuit Court

of Appeals, District of Columbia, EPA's final determination that the Emery power plant is subject to the PSDR.

The analysis of air quality impacts based on UP&L's statement of its proposal (no FGD) appears in Chapter 3 and respresents the worst-case condition. Any combination of FGD controls on Emery or Emery and Huntington power plants would almost certainly lower impacts on air quality.

This section addresses the alternative of either one or both units at Emery being equipped with flue gas desulfurization equipment. Table 8-25 shows the calculated maximum ground-lever SO_2 concentrations and the required SO_2 emission control to meet the National Ambient Air Quality Standards (NAAQS) and PSDR.

The SO_2 emissions would have the greatest impact on the short term 3-hour NAAQS. Table 8-26 shows the magnitude of the impact on the maximum predicted 3-hour concentration from the Emery plant with its 3 possible configurations; (1) two units without FGD, (2) two units with FGD, and (3) one unit with and one without FGD (Cramer and Bowers, 1976). It also shows the location of these maximum predicted concentrations in Universe Transverse Mercador (UTM) coordinates.

Figures 8-11 through 8-16 show calculated isopleths for annual 24-hour, and 3-hour ground-level SO_2 concentrations in $\mu g/m^3$ for Emery, assuming either one or both units would be equipped with FGD control equipment (Cramer and Bowers, 1976). Comparing the highest isopleth SO_2 concentration to the applicable PSDR increment in Table 8-25, it can be seen that the Emery plant would easily meet these regulations if one or both units were actually equipped with FGD.

If FGD is required, it is UP&L's intention to use wet lime scrubbers (VTN, 1975a). The wet lime scrubber process is a nonregenerative

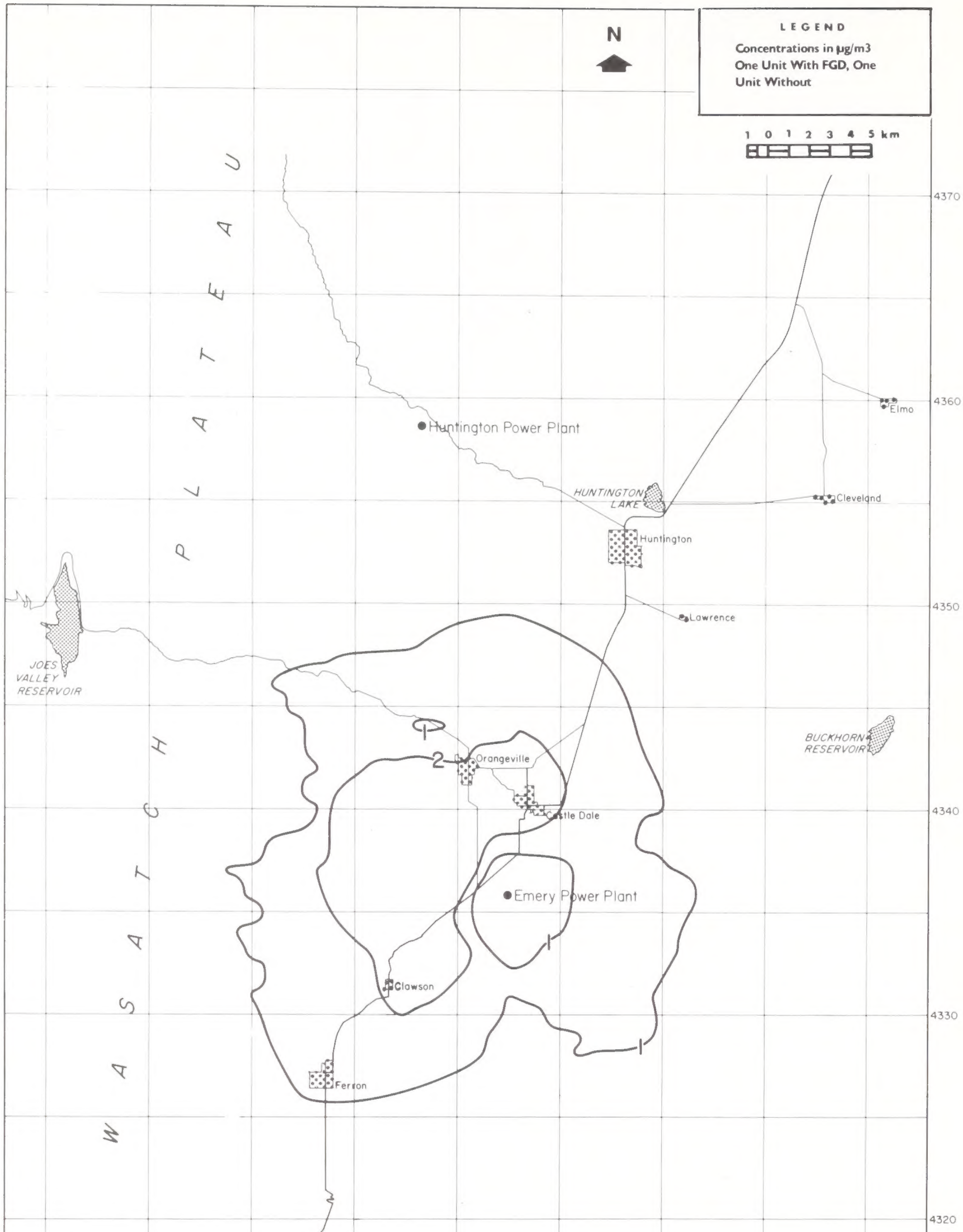
TABLE 8-25

Sulfur Dioxide Concentrations and Standard Requirements

Calculated Maximum Ground-Level Concentrations Under Plume Trapping Conditions and Required SO_2 Emission Control to Meet NAAQS and PSDR

Sulfur Dioxide Standard	Maximum Calculated Ground Level Concentration ug/m^3				Allowable Concentration		Percent Control Required NAAQS				Percent Control Required PSDR Class II			
	NAWC[a]	VTN[a]	BLM[a]	CRAMER	NAAQS	PSDR	NAWC	VTN	BLM	CRAMER	NAWC	VTN	BLM	CRAMER
Annual	9	15	10	6	80	15	0	0	0	0	0	0	0	0
24-Hour	160	225	206	48	365	100	0	0	0	0	37.5	55.6	51.5	0
3-Hour	720	1000	928	562	1300	700	0	0	0	0	2.8	30.0	24.6	0

[a]NAWC, VTN, and BLM all used the same modeling approach (Anderson and Sutherland, 1974). Differences are the result of the use of different source terms.



Universal Transverse Mercator x and y Coordinates

FIGURE 8-11

ANNUAL AVERAGE GROUND-LEVEL SO_2 CONCENTRATIONS (ONE UNIT WITH FGD, ONE UNIT WITHOUT)

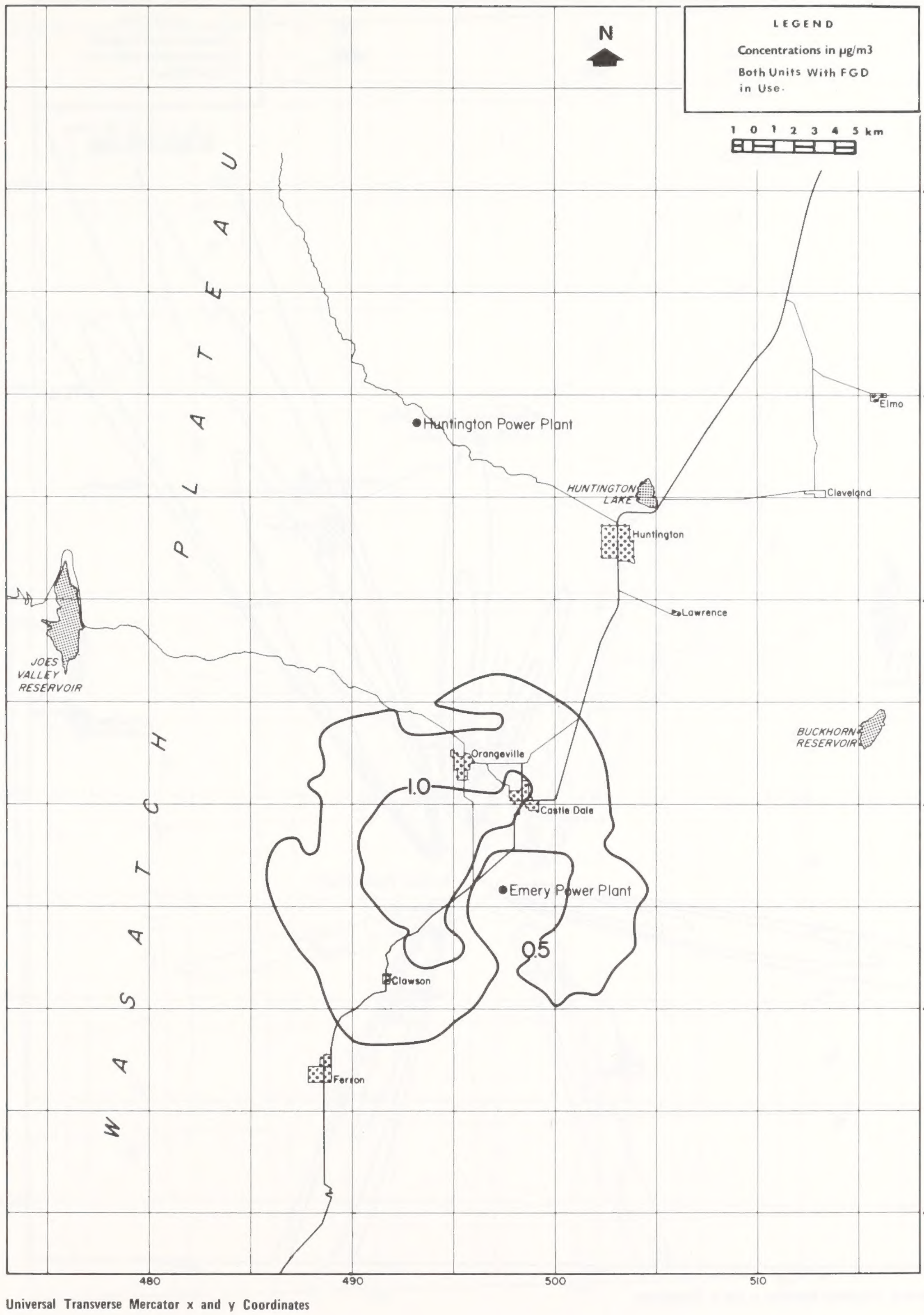


FIGURE 8-12

ANNUAL AVERAGE GROUND-LEVEL SO_2 CONCENTRATIONS (BOTH UNITS WITH FGD IN USE)

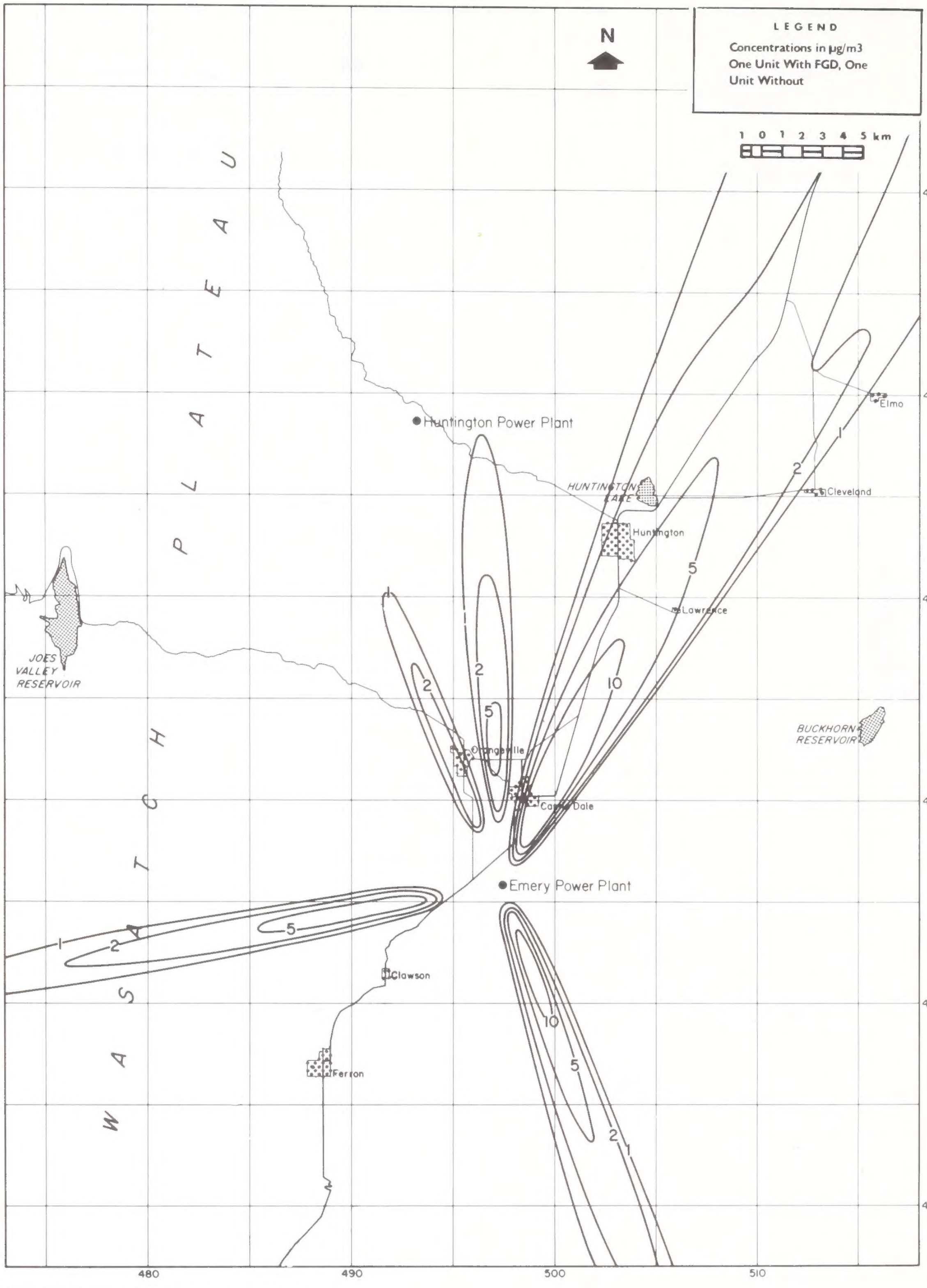
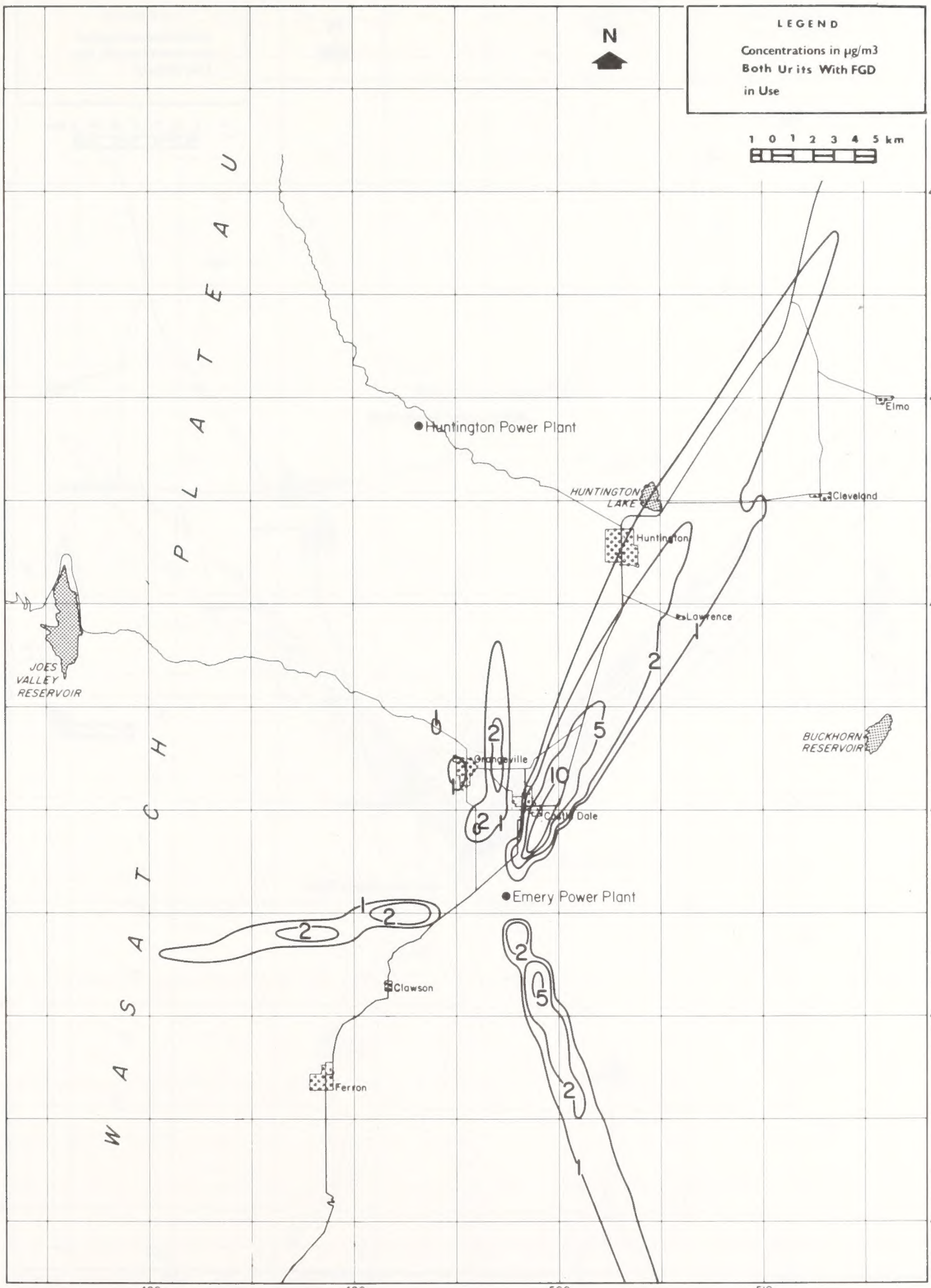


FIGURE 8-13

24-HOUR AVERAGE GROUND-LEVEL SO_2 CONCENTRATIONS (WORST-CASE 24-HOUR PERIOD) (ONE UNIT WITH FGD, ONE UNIT WITHOUT)



Universal Transverse Mercator x and y Coordinates

FIGURE 8-14

24-HOUR AVERAGE GROUND-LEVEL SO_2 CONCENTRATIONS (WORST CASE 24-HOUR PERIOD) (BOTH UNITS WITH FGD IN USE)

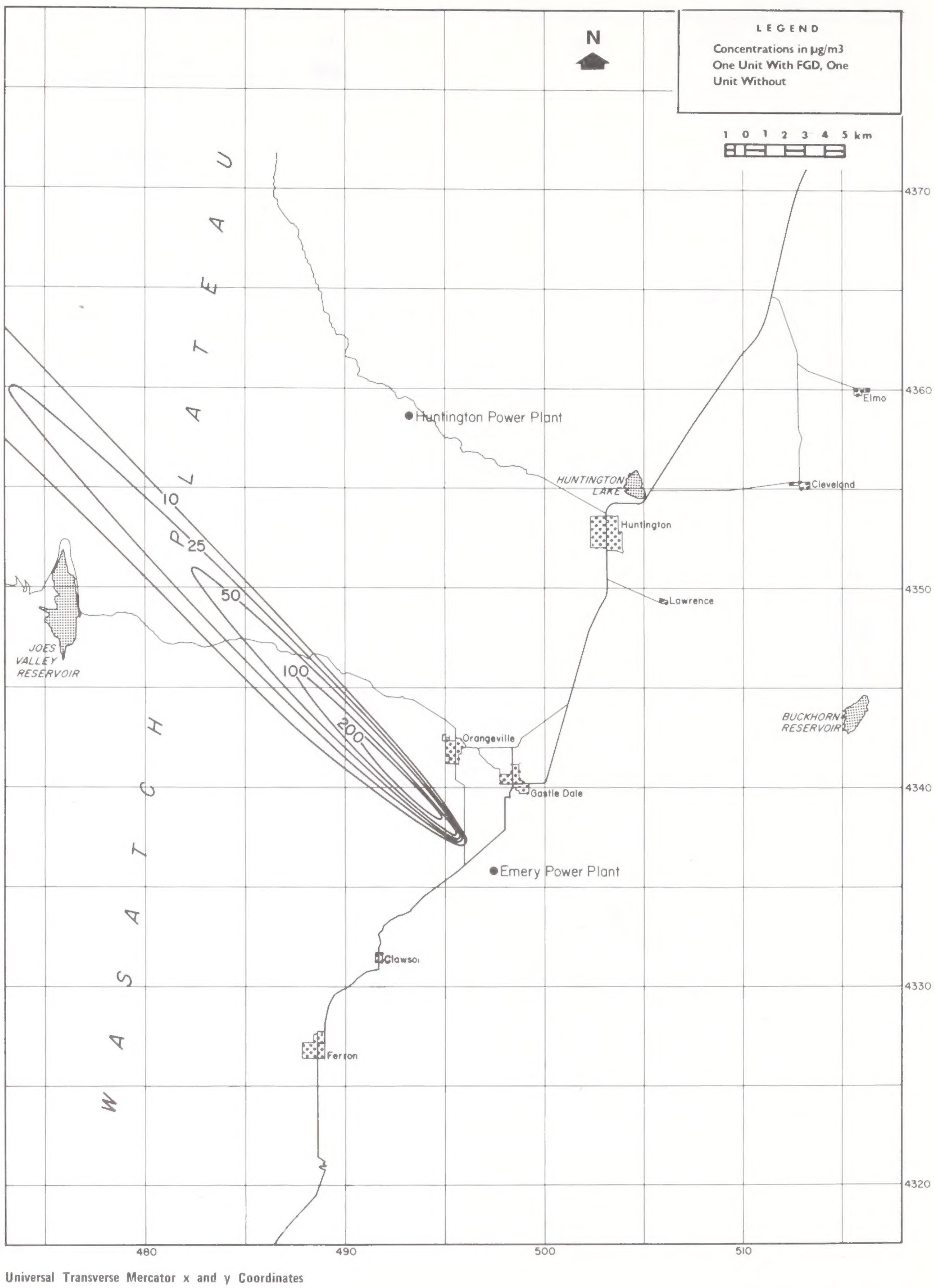


FIGURE 8-15

3-HOUR GROUND-LEVEL SO_2 CONCENTRATIONS (WORST-CASE 3-HOUR PERIOD) (ONE UNIT WITH FGD, ONE UNIT WITHOUT)

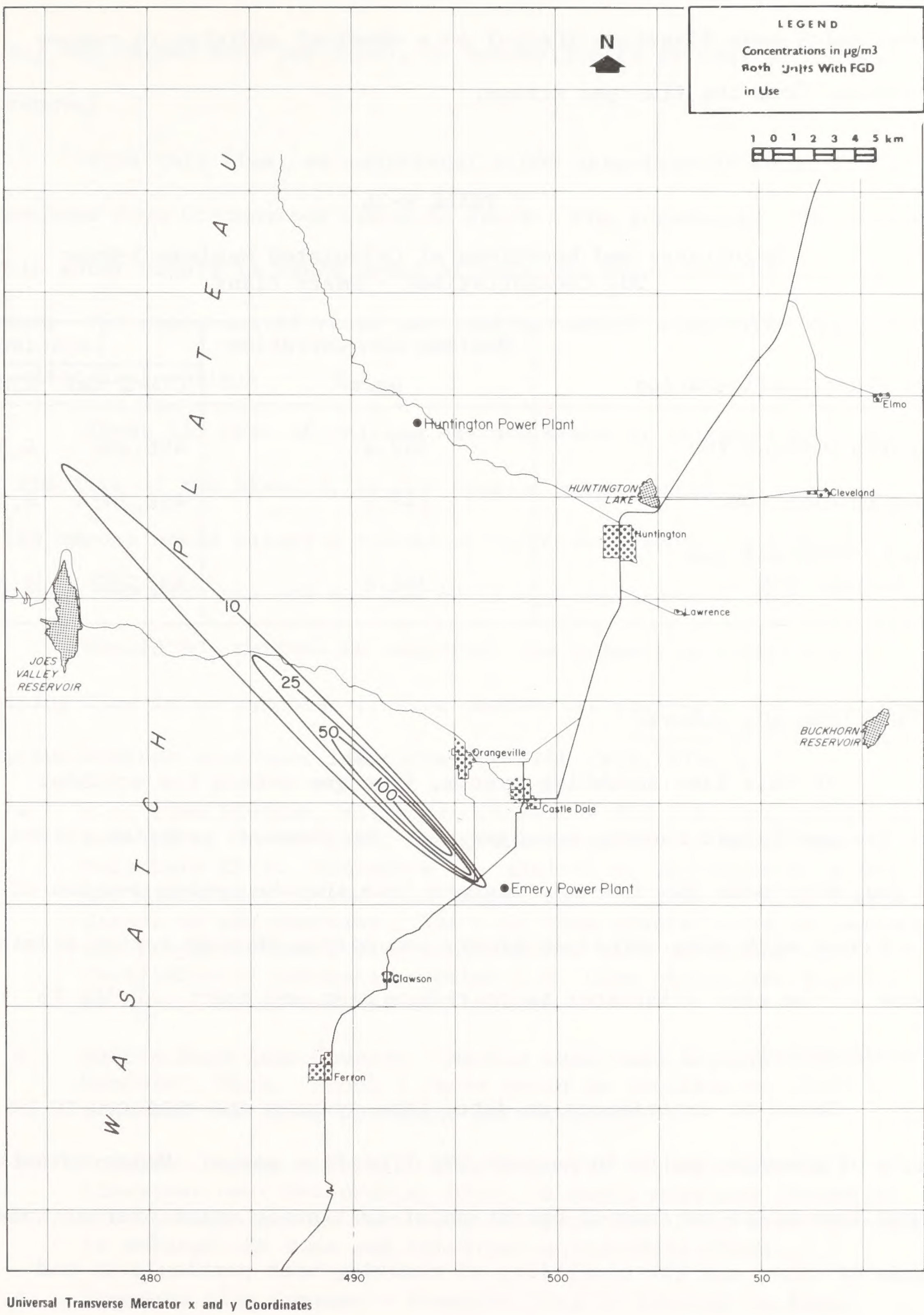


FIGURE 8-16

3-HOUR GROUND-LEVEL SO_2 CONCENTRATIONS (WORST-CASE 3-HOUR PERIOD) (BOTH UNITS WITH FGD IN USE)

process which uses limestone ($CaCo_3$) as a chemical additive to remove SO_2 content from the flue gas stream.

TABLE 8-26

Magnitudes and Locations of Calculated Maximum 3-Hour SO_2 Concentrations - Emery Plant

Emery Plant Configuration	Maximum Concentration $\mu g/m^3$	Location	
		UTM X (m)	UTM Y (m)
Two units without FGD	562.2	498,202	4,335,043
Two units with FGD	148.9	498,202	4,335,043
One unit with and one unit without FGD	355.8	498,202	4,350,043

2. Wet Lime SO_2 Removal

In this lime scrubbing system, flue gas enters the scrubber where the gas/liquid contact necessary for the chemical reaction occurs. The flue gas, with most SO_2 removed, emerges from the absorption section of the scrubber with some entrained slurry and passes through a mist eliminator. Purpose of the mist eliminator is to reduce mist and drift. Drift is entrained slurry.

Based on experiences to date, lime systems are expected to be capable of removing up to 90 percent SO_2 from flue gases. Major advantages of this system are successful operation of full scale units over extended periods of time, and the capability of removing both particulates and SO_2.

For the Emery generating complex, approximately 36 tons of lime would be required daily for each unit (for two units 72 tons total

per day and 26,300 tons per year), to accomplish 80 percent or higher SO_2 removal.

With this lime, an additional 1,000 acre-feet of water would be required from Cottonwood Creek to operate the scrubbers. The analysis of this water supply is found under Alternative Water Sources in this chapter. The operation of these wet lime scrubbers would also require some electrical energy.

About 216 tons of calcium sulfate would be produced each day. Over the life of the plant 2,765,000 tons of sludge would be produced and the amount would occupy a volume of 1,300 acre-feet. The sludge would be mixed with the ash and placed in the ash disposal area.

Should SO_2 removal be required, the primary proposal for obtaining lime is to purchase it from commercial sources. The following tentative sources have been identified by UP&L (VTN,1975a):

a. U.S. Lime Divison, Flintcote Company - The U.S. lime plant is located at Grantsville, Utah, approximately 45 miles west of Salt Lake City. Limestone is calcined at the Dolomite plant two miles west of the flux plant, and the lime is also shipped direct to the customer. The U.S. Lime plants could accomodate the projected Emery lime requirements with no expansion of facilities or personnel. Other U.S. Lime plants are located at Apex, Nevada and Nelson, Arizona.

b. Marble Head Lime Company - Marble Head owns deposits near Wendover, Utah. About 2 years would be required to place a mine and calcining operation in service.

c. Formico Company - Formico owns deposits of high calcium limestone near Sulfurdale, Utah. A small mine and limestone processing plant is currently in operation. The owner proposed to enlarge the mine and construct a calcining plant.

d. Standard Slag Company - Standard Slag is located in Reno, Nevada. However, the location of the particular mine or plant that could supply the Emery plant is not known.

(1) Major Advantages of the Wet Lime Process

The wet lime process would remove up to 90 percent of SO_2 emissions. Also, the emission rate of SO_2 would be reduced from 83 to 92 tons without control to 17 to 18 tons per day with control. This process has been successfully used on a number of power plants.

(2) Major Disadvantages of the Lime Process

An additional 1,000 acre-feet of water would be required to operate the scrubbers. Plus 20 MW of electrical energy would be also required to operate the scrubbers.

Disposal of and care for some 1,300 acre-feet of sludge over the life of the plant would be necessary.

(3) Major Adverse Impacts

Agricultural production would be lost on approximately 250 acres due to appropriation of 1,000 acre-feet of water for industrial use.

Electrical power, (20 MW) sufficient to provide energy to a city of approximately 20,000 persons, would also be lost.

(4) Mitigation

If a wet lime scrubber system is used, there would be no methods to mitigate the major adverse impacts.

3. <u>Alternative Particulate Removal System</u>

Industry uses many kinds of particulate removal systems, but most of them lack the efficiency necessary to remove 99 percent of the particulates in the stack gases. Two methods which have demonstrated ability to remove particulates with high efficiencies are electrostatic precipitators and baghouses. A comparision of removal efficiencies

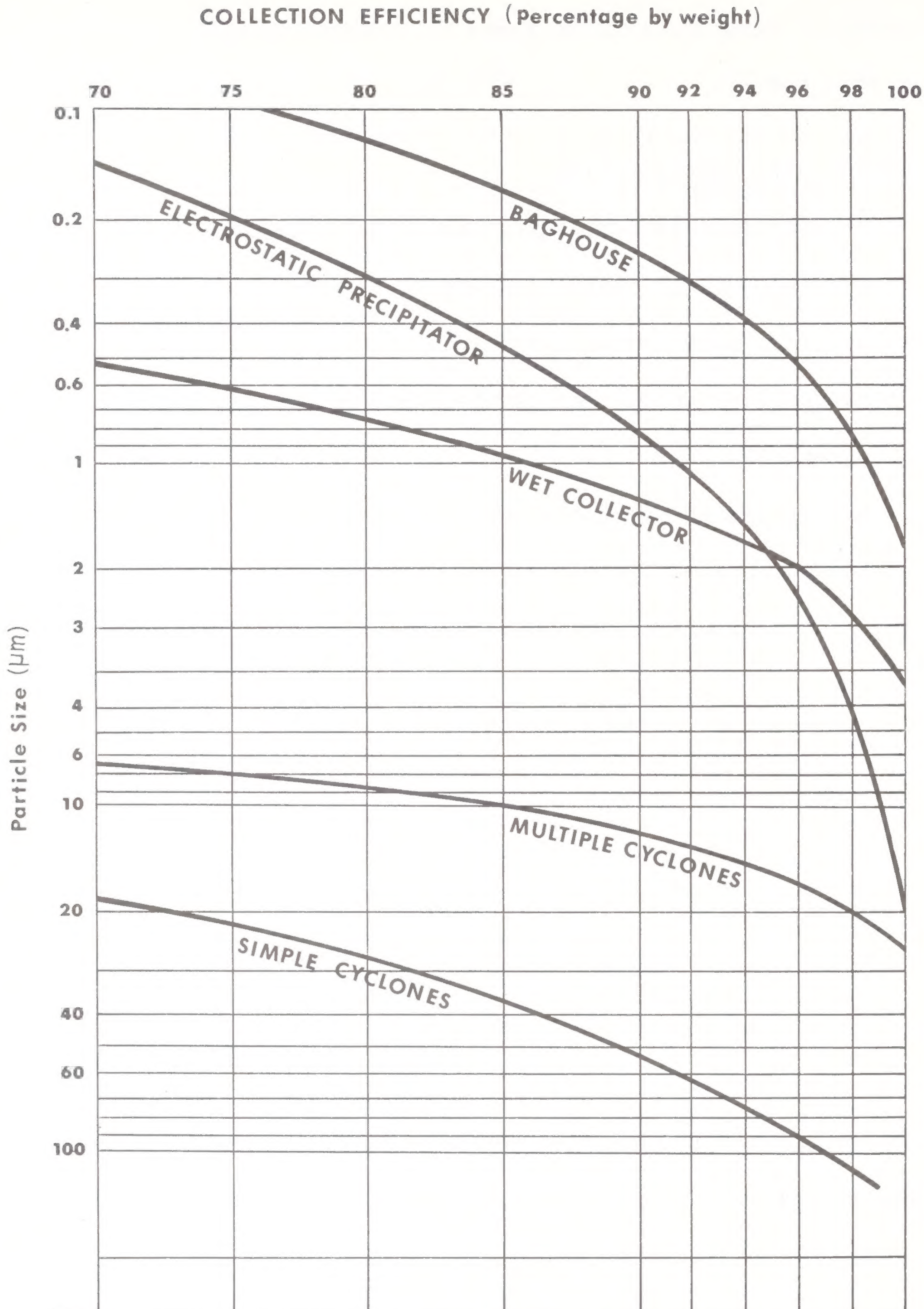
versus particle size for various kinds of particle-removal systems is shown in Figure 8-17.

a. Electrostatic Precipitation

In electrostatic precipitators, stack gases are passed between highly charged plates (or plates and wires, or wires and tubes), charging solid particles so they can be attracted out of the stream of gases onto collector plates from which they can be vibrated or rapped downward into hoppers for removal.

Electrostatic precipitators are used at more large plants than any other type of high-efficiency particulate matter collector. Electrostatic precipitators occupy a large amount of space, and often are larger in size than the boilers they serve. They are costly to install, but operating cost is moderate. A well-designed precipitator, properly maintained and operated within design limits, will perform consistently at or above design efficiencies throughout its serviceable life (EPA, 1972).

Two general types of electrostatic precipitators are in use, "hot-side" and "cold-side". The designation refers to whether the precipitator is set between the boiler and the air preheater, or between the air preheater and the stack. The hot-side precipitator is designed to operate upstream of the air preheater at temperatures of 650 to 850 degrees Fahrenheit. Hot-side precipitators are larger and more expensive to install than cold-side precipitators but have an advantage in high-resistivity particles (those having less tendency to precipitate). Its performance is relatively insensitive to most of the uncertainties encountered using a cold-side precipitator.



Source: EPA

FIGURE 8-17

SIZE EFFICIENCY CURVES FOR PARTICULATE CONTROL EQUIPMENT

The main reason for considering a hot-side precipitator is that normally the resistivity of the hot-side fly ash is lower than that of the cold-side fly ash; and with some of the western low-sulfur coals, cold-side precipitators do not operate efficiently. The curve of resistivity versus temperature of fly ash from these coals normally peaks out in the range of 250 to 350 degrees Fahrenheit. This temperature is in the operating range of cold-side precipitators. Consequently, more confidence in the efficiency and reliability of performance, greater flexibility in fuel variation, and easier material handling could be expected from a hot-side precipitator.

Advantages of the hot-side precipitator are that performance is relatively insensitive to fly ash chemistry and electrical characteristics. This allows greater flexibility in fuel variation, and it operates above the temperature range of expected peak resistivity in low-sulfur coals.

Disadvantages of the hot-side precipitator are: An increase in size of the precipitator to handle the larger gas volume due to the higher temperature, large amounts of extra ducting required because the air heater must be placed on the back end of the precipitator, higher operating temperature coupled with larger size create problems of maintaining alignment of components to provide for expansion, maintaining seals of expansion joints and other contacts, and deterioration of internal parts.

With some western low-sulfur coals the need to use hot-side precipitation outweighs the disadvantages. However, information furnished by UP&L indicates that the resistivity of the fly ash from the low-sulfur coal at the Emery plant is sufficiently low to make the use of

cold-side precipitators practical.

Because of the chemical make-up of the coal, both cold and hot precipitators could perform adequately at the Emery power plant, i.e., 99.5 percent removal efficiency. The efficiency of a cold-side precipitator can vary with changes in fly ash chemistry and electrical characteristics in low-sulfur coals. Without this information on fly ash chemistry and electrical characteristics, the design of a cold precipitator can be an uncertain operation, and precipitator performance would be difficult to predict.

The UP&L has four cold-side precipitators in service at plants using the coal from the same seams that will be used at the Emery plant. All of these units have operated satisfactorily on the type of low-sulfur coal to be used at Emery.

b. Fabric Filtration

One of the oldest and most positive methods for removing solid particulate contaminants from gas streams is by filtration through a fabric medium.

The use of filters (commonly called a baghouse) can remove all particulate matter over 2 micrometers (μm) in size. It is also capable of providing a higher collection efficiency for particulates as small as 0.5 μm, and will remove a substantial quantity of particulates as small as 0.01 μm (EPA, 1972a). Baghouses are simply porous-fabric filter bags housed in a large structure. When dust-laden gases pass through these filters, particulate matter is collected by the bag fabric and then removed by a dust-dislodging step. The particulate removal capability of a baghouse can be expected to exceed 99.5 percent.

Major advantages of the filtration system are that filters can be operated under a wide range of operating conditions; maintenance can be performed during operation without disturbing filtration efficiency; and there is high collective efficiency for sub-micrometer particulates.

Disadvantages of the filtration system are bulky construction and large space requirement, moisture limitations (the gas temperature must be above its dew point at all times to avoid moisture condensation), and possible bag rupture which could create injurious health problems to employees and allow considerable fly ash to escape into the atmosphere.

A baghouse has a high initial cost and a high operating cost. It also causes a moderate pressure drop between inlet and outlet gas streams.

While highly efficient, at a smaller scale, baghouses have not been evaluated for efficiency at a scale needed for a 860 MW coal-fired plant.

Other than the disadvantages just listed, the impacts of a baghouse on air quality would not differ from the impacts of a hot electrostatic precipitator.

c. Wet Collector System

A venturi-type scrubber for particulate removal is a high energy wet scrubber. The flue gas and liquid are accelerated through the venturi throat, causing atomization of the scrubber liquid. Fast-moving solid particles penetrate into the water droplets and become wet and agglomerated, and are usually floated out in a condensed spray. They are then removed in the form of a slurry.

Wet collectors can remove about three-quarters of the 0.5

micrometer particles, and all particles above 1 μm size, with an overall efficiency above 90 percent. Removal efficiency of a venturi-type scrubber is determined by particle size and pressure drops in the scrubber system. To obtain a removal efficiency of 99.5 percent at Emery, large pressure drops would be required.

Advantages of the venturi system are that compared to electrostatic precipitators and baghouses, venturi-type scrubbers require less space, and fly ash is removed in the form of a slurry. There is a high pressure drop across the system resulting in more efficient particulate collection. The wet system would also remove some SO_2 from the flue gas stream.

Disadvantages of the venturi system are water consumption for the slurry and greater fuel consumption.

4. Alternative Cooling System

In order for the turbine steam to be reused, it must be condensed into water. Condensation is accomplished by transferring heat from the steam to a circulating water system. Heat transferred from the steam to the circulating water is then dissipated through the use of a cooling system.

The Company proposes to use wet-dry mechanical-draft cooling towers at the Emery site. However, other types of cooling systems are available, although they would have different environmental impacts.

a. Wet Cooling Towers

Wet-type mechanical-draft cooling towers induce direct contact of ambient air with the circulating cooling water by drawing air through a water mist and exhausting the resulting air-vapor mixture out the top of the tower. Operation of the cooling towers would result in evaporative

losses of water, drift losses, and blow-down water. Blow-down water removal is necessary to prevent an increase in the concentration of dissolved solids. Drift is that portion of the cooling tower circulating water discharge to the atmosphere in droplet form after having been mechanically entrained in the cooling air stream. The drift contains entrained salts that would be deposited on the ground within the plant boundaries.

Wet cooling is inherently more efficient than dry or wet-dry cooling. Fan and pumping power would be reduced as much as 20 to 30 percent (depending upon the design) compared to the wet-dry system (USDI, 1976).

A wet system would cost approximately one-sixth of a comparable wet-dry, water conservation cooling tower designed for winter ambient conditions (USDI, 1976).

Extensive experience has been gained in the use of wet cooling towers with large coal-fired power plants in the Southwest. There are only two wet-dry, plume abatement, cooling towers in operation within the United States (and no water conservation cooling towers) - one 14 cell wet-dry cooling tower for a 500-MW power plant, in operation less than one year; and one small, three cell, wet-dry cooling tower built for a chemical plant in operation just over a year. The first unit of Emery would contain a wet-type cooling tower with the design for conversion to a wet-dry system with the second 430-MW unit. If it is decided to have wet cooling on both 430-MW units, additional water necessary to operate the wet-type towers would come from Cottonwood Creek. Shares are owned by UP&L in the Cottonwood Irrigation Company (see Alternative Water Sources).

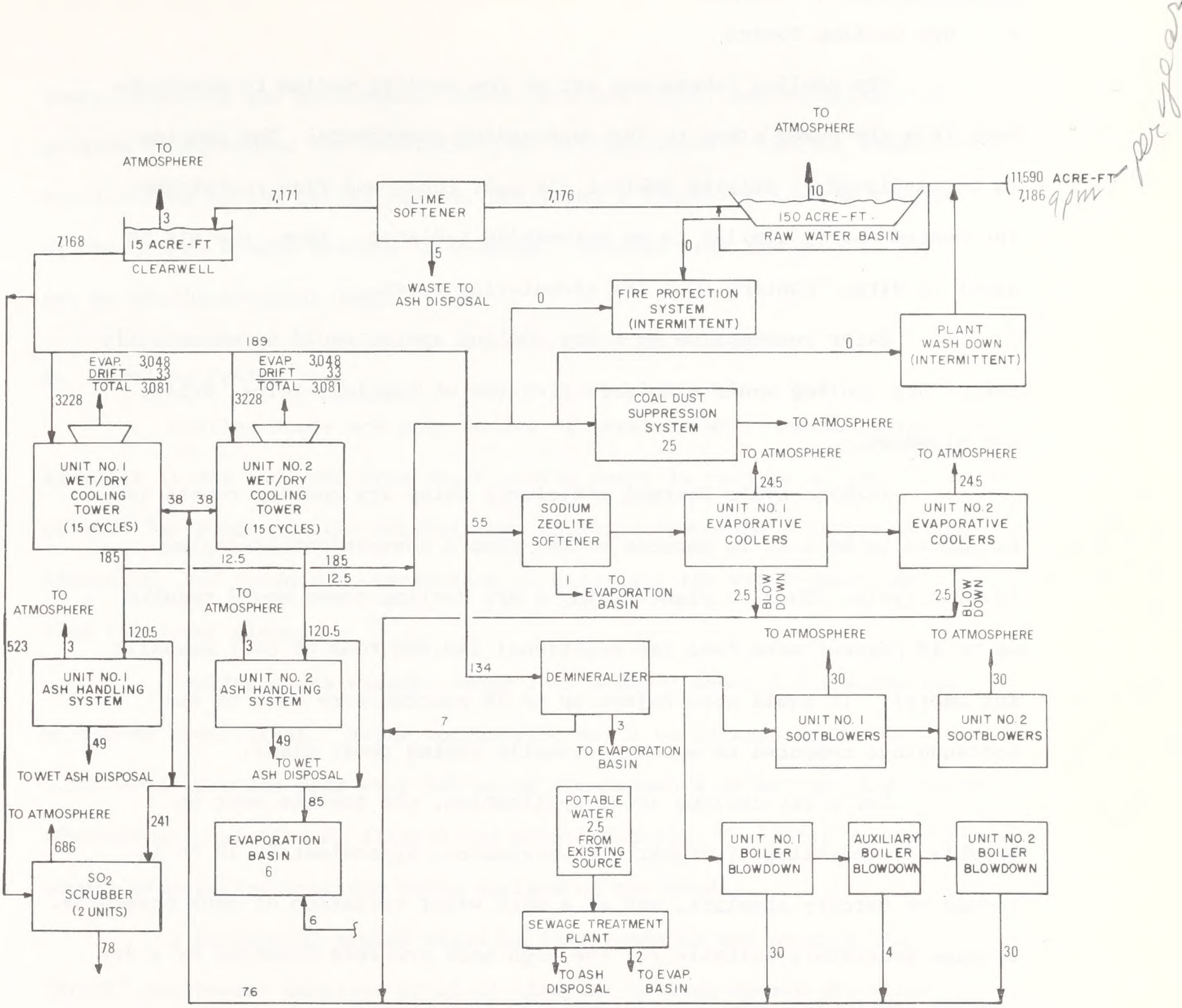
Water lost in a wet cooling system by evaporation, blow-down, and drift loss can be as much as 60 percent greater than with a wet-dry system. This is a very significant consideration in areas, such as the arid West, where water conservation can be an overriding consideration.

To supply water for a wet cooling tower for both units, an additional 4,672 acre-feet of water over a wet-dry cooling system would be required (Figure 8-18). The use of this water would remove an additional 1,186 acres of irrigated crop land from production (approximately 2.5 percent of irrigated crop lands in Emery County). The removal of this production would result in the loss of approximately 200,000 pounds of marketable beef (prior to processing) annually for as long as the water was used for wet cooling towers. This impact would be of local significance considering only Emery County is involved; the duration would be for the life of the project.

Associated with the increased evaporation and drift loss (6,162 gallons per minute [gal/min] as compared to 3,944 gal/min) would be a significant increase in the occurrence of a visible steam plume. Increased drift loss would result in an increase in salt deposition, of 547 tons per year compared to 350 tons per year.

These impacts would last as long as the wet cooling towers were utilized. The impact of the steam plume on visibility would be a local one as described in Chapter 3 and would not be significant.

Use of 11,590 acre-feet of water, would result in the retirement of 2,955 acres of irrigated crop land. The resulting loss of 500,000 pounds of live weight, marketable beef would represent an unavoidable adverse impact.



Note: Flow rates are in yearly averages and, unless otherwise noted, in gallons per minute (gal/min).

3081
3081
6162

FIGURE 8-18

WATER BUDGET–EMERY UNITS NUMBER 1 AND 2 (USING ALL WET COOLING TOWERS)

b. Dry Cooling Towers

Dry cooling towers use air as the cooling medium to dissipate heat from the power plant to the surrounding atmosphere. The cooling is accomplished by drawing ambient air past tubes and fins containing the heated water, similar to an automobile radiator. Thus, the air is never in direct contact with the circulating water.

Water consumption by a dry cooling system would be essentially zero. Dry cooling would eliminate problems of fogging, icing, drift, and blowdown.

Turbine cycle thermal efficiency using dry cooling towers is estimated to be 4 to 10 percent poorer than a conventionally-cooled turbine cycle. Thus, a plant having a dry cooling tower would require up to 10 percent more fuel (an additional 240,000 tons of coal annually for Emery). It would also reject up to 18 percent more heat to the surroundings compared to a conventionally cooled power plant.

For a dry cooling tower application, the turbine must be capable of operating at higher peak pressures, approximately 10 to 14 inches of mercury absolute, and at a much wider variation of back pressures. Turbine generators suitable for the high back pressure required by a dry cooling tower plant are not currently in production.

The large exposed heat transfer surfaces of a dry cooling tower are susceptible to rapid cooling, and the possiblity of freezing the condensation inside the finned tubes during cold weather. The result is a reduced or accidental loss of load. Available experience does not provide a solid basis to assess lifetime reliability, maintainability, and other operating characteristics of this equipment. The

Energy Research and Development Administration (ERDA) has established a program to determine the feasibility of dry and wet-dry cooling tower applications in the United States, utilizing a long-term testing program at the 330-MW Wyodak Station in Wyoming. Results from the program will not be available until 1982.

c. Cooling Ponds

Cooling ponds are open bodies of water to which heated water is added at one end, and from which cooled water is removed at the other. The ponds use the natural heat exchange processes of evaporation, radiation, and conduction-convection to dissipate the waste-heat load from the power plant.

Cooling ponds require large land areas - about 1,700 acres for an 860-MW power plant. Water consumption would be increased by some 6,500 acre-feet per year over the water requirements of wet cooling towers (discussed in section H, Alternative Water Supply). The water is lost through normal evaporation over the large surface of the pond.

A beneficial impact would be that ponds do not produce the "drift" (saltwater droplets of mist) that wet cooling towers do; hence they avoid the environmental effects of drift on soil and vegetation. Also, unless water quality is very poor, the edges of cooling ponds often become excellent habitat for small animals, and the ponds provide temporary stop-over points for migrating waterfowl.

Adverse impacts would be as follows:

The construction of a cooling pond would require 1,700 acres of land. A probable location for the pond at the Emery site has not been determined, but wildlife and vegetation would be displaced or

eliminated over at least that much area. This acreage would remain occupied by the cooling pond for the life of the project. This impact would be of a local significance only.

An additional 11,172 acre-feet of water would be required annually if cooling ponds were used instead of the proposed wet-dry system (USDI, 1976). This additional water would retire 3,192 acres of irrigated land (about 8 percent of irrigated crop lands in Emery County) with a resulting loss of about 860,600 pounds of live weight marketable beef. This impact would be of local significance, only Emery County being involved. The duration would be for the life time of the project. The loss of vegetative production on irrigated crop land would be an unavoidable adverse impact.

D. COAL SOURCES

Alternate coal sources that could be selected to supply coal to the Emery coal-fired generating plant are the Old Woman Plateau, North Horn Mountain, Crandall Canyon, and the Deer Creek Mine.

All of these areas are part of the Wasatch Plateau coal field. The Old Woman Plateau area, in Sevier County, is west-southwest of the city of Emery, Utah. The North Horn Mountain area is west of Castle Dale, in Emery County, Utah. The Crandall Canyon area is approximately 12 miles northwest of Huntington, Emery County, directly adjacent to Huntington Canyon. The Deer Creek Mine is directly north and adjacent to the Wilberg Mine. Figure 8-19 shows locations of these sources.

The coal reserves of the Deer Creek Mine are large enough to supply the needs of the Emery plant, as well as the two units of the Huntington Canyon power plant.

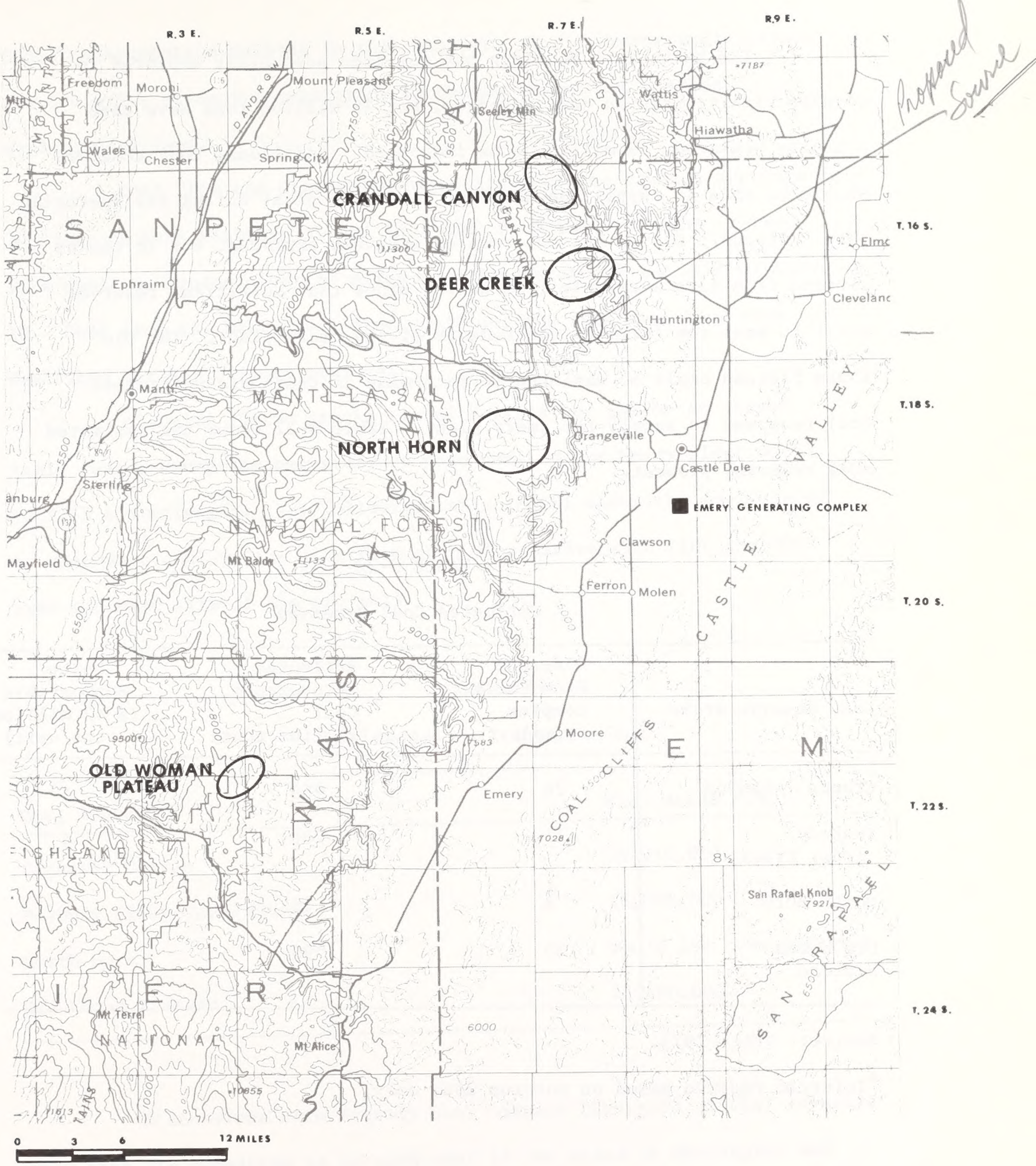


FIGURE 8-19

ALTERNATIVE COAL SOURCE LOCATIONS

The North Horn Mountain has not been adequately explored to develop firm figures on coal reserves, but 29 million tons have been actually measured, 59 million tons indicated. Additional coal reserves should be able to supply the needs of the Emery plant during its operating life. Crandall Canyon has not been extensively explored, but it can be assumed from data available from nearby mines that sufficient reserves exist to meet the further requirements of the Emery plant. The Old Woman Plateau could be explored to determine if there are sufficient coal reserves to supply the Emery plant. Table 8-27 shows the estimated coal reserves present.

TABLE 8-27

Estimated Coal Reserves

Coal Reserve Areas	Distance From Emery Complex (mi)	Estimated Recoverable Coal (million tons)	Units Supportable (@ 42 million tons/unit)
Crandall Canyon	26	[a]50	1
Peabody (Deer Creek)	13	200	4
North Horn	8	46	1
Old Woman Plateau	35	[a]90	2

Source: UP&L, 1975.

[a]Inferred reserve based on outcrop data only.

Coal from the North Horn Mountain field would be transported into the site by a conveyor 8 miles long, and of design discussed in Alternative

Coal Transportation Methods in this chapter. The conveyor would cross about 6 miles of native vegetation on Mancos Shale, and 2 miles of agricultural land.

Coal from the Crandall Canyon site would be trucked approximately 26 miles on Utah Highways 31 and 10. Coal from the Old Woman Plateau site would be hauled about 50 miles over Interstate 15 and Utah Highway 10. Coal from the Deer Creek Mine would use the same coal haul road described for the primary proposal.

Assuming 30-ton trucks travel 8 miles per gallon on diesel fuel, fuel consumption necessary to move coal to the Emery plant would be 3.75 ton mile/gal. The following table (8-28) shows the fuel needed to transport coal to the site from each alternative site (for the 35-year economic life of the project).

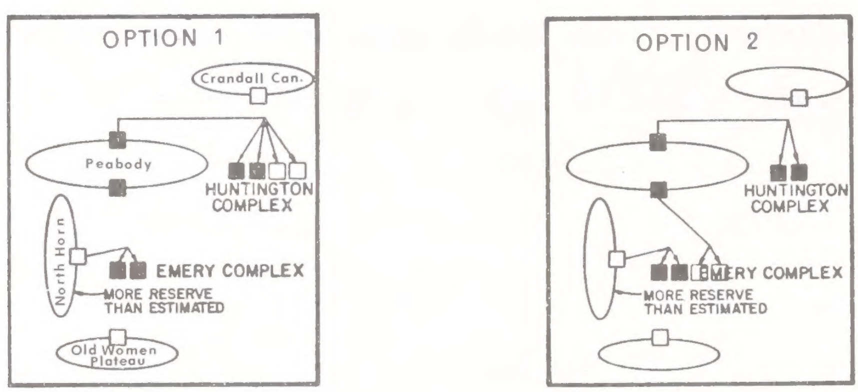
TABLE 8-28

Fuel Needed to Transport Coal

Coal Source	Fuel Needs (Gal)
Crandall Canyon	58,240,000
Peabody (Deer Creek Mine)	18,095,000
North Horn	Would use conveyor belt
Old Woman Plateau	78,400,000

Discussions with Peabody Coal Company (Thurgood, 1976a) revealed that they are committed to furnish coal to two units at Huntington and two units at Emery, from the Wilberg-Deer Creek mining complex.

Utah Power and Light Company might build six units in Emery County - four at Huntington and two at Emery, or four at Emery and two at Huntington. If the former goal is to be a reality, Options 1 and 1A (Figure 8-20) would be most beneficial. If the latter, then Options 2 and 2A appear most beneficial. If further study reveals that there is not sufficient coal in the North Horn field, then Options 1A and 2A could be implemented.



Options 1 and 2 are the most beneficial expansive alternatives – but based on speculation that the North Horn reserves are greater than presently estimated.

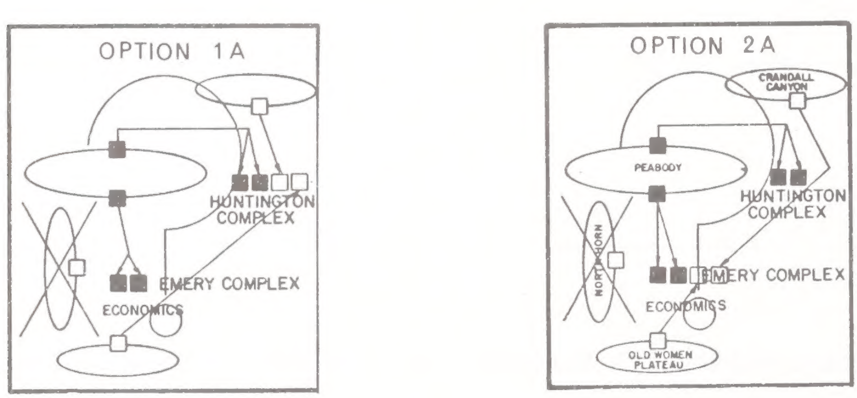


FIGURE 8-20

COAL SUPPLY OPTIONS

The coal seams lie above the base of the Black Hawk formation, generally in the steep cliff areas of high relief. Overburden varies from 1,000 feet to 2,000 feet. Environments of the alternative coal sources are similar to that of the Wilberg Mine.

Impacts would be virtually the same at the alternative coal sources as at the Wilberg Mine. If sufficient coal is not found in the North Horn field, and two more units were built at the Emery or Huntington site, then transportation costs would increase and haul routings would change.

Mitigating measures would also be the same as those for the Wilberg Mine, explained in Chapter 4.

The loss of 168 million tons of coal reserves from the Old Woman Plateau, North Horn Mountain, Deer Creek Mine, or Crandall Canyon would be an unavoidable impact. Also, additional fuel would be used to transport coal from the Old Woman Plateau, and Crandall Canyon.

E. MINING TECHNIQUES

Peabody Coal Company proposes to mine the Hiawatha coal seam at the Wilberg Mine by the room-and-pillar, continuous-mining method as described in Chapter 1. Peabody presently has no longwall or shortwall mining equipment, but plans trial operation of an automated continuous mining system. The following describes alternative mining methods.

1. Automated Continuous Mining

This method is the same as the room-and-pillar continuous-mining method except that the mining machines are operated from remote control units, therefore lessening mining hazards. Because of this,

more coal can be removed from the face in a single operation.

Several companies are working on the development of programmed mining cycles, machine movement, coal transfer, and instrumentation as adapted to today's remotely-controlled, continuous-mining machines. Factors being considered are: Safety of mine personnel, lower costs per ton of coal mined, maximum productivity, quality of coal produced, percentage of recovery, and environmental considerations.

2. Conventional Room-and-Pillar Mining

In conventional room-and-pillar mining, entries are driven into a rectangular lattice, then hollowed out to form rooms separated by pillars of coal left to support the roof. A number of entries along the faces are worked at one time to permit simultaneous undercutting, drilling, placing of explosives, blasting, loading coal, and roof bolting without mutual interference (Figure 8-21).

Most common in the United States, conventional room-and-pillar mining is gradually being replaced by the more efficient continuous mining method.

3. Longwall Mining

Longwall mining is used extensively throughout much of the world. The rectangular lattice of room-and-pillar mining is laid out, but on a much larger scale. Longwall blocks or "panels" range from 300 to 600 feet wide and are sometimes as much as 1.5 miles long. The longwall machine moves along the face, plowing or shearing coal and loading it into a primary conveyor which delivers it to a secondary conveyor for transport to the mine portal. The roof is supported in the

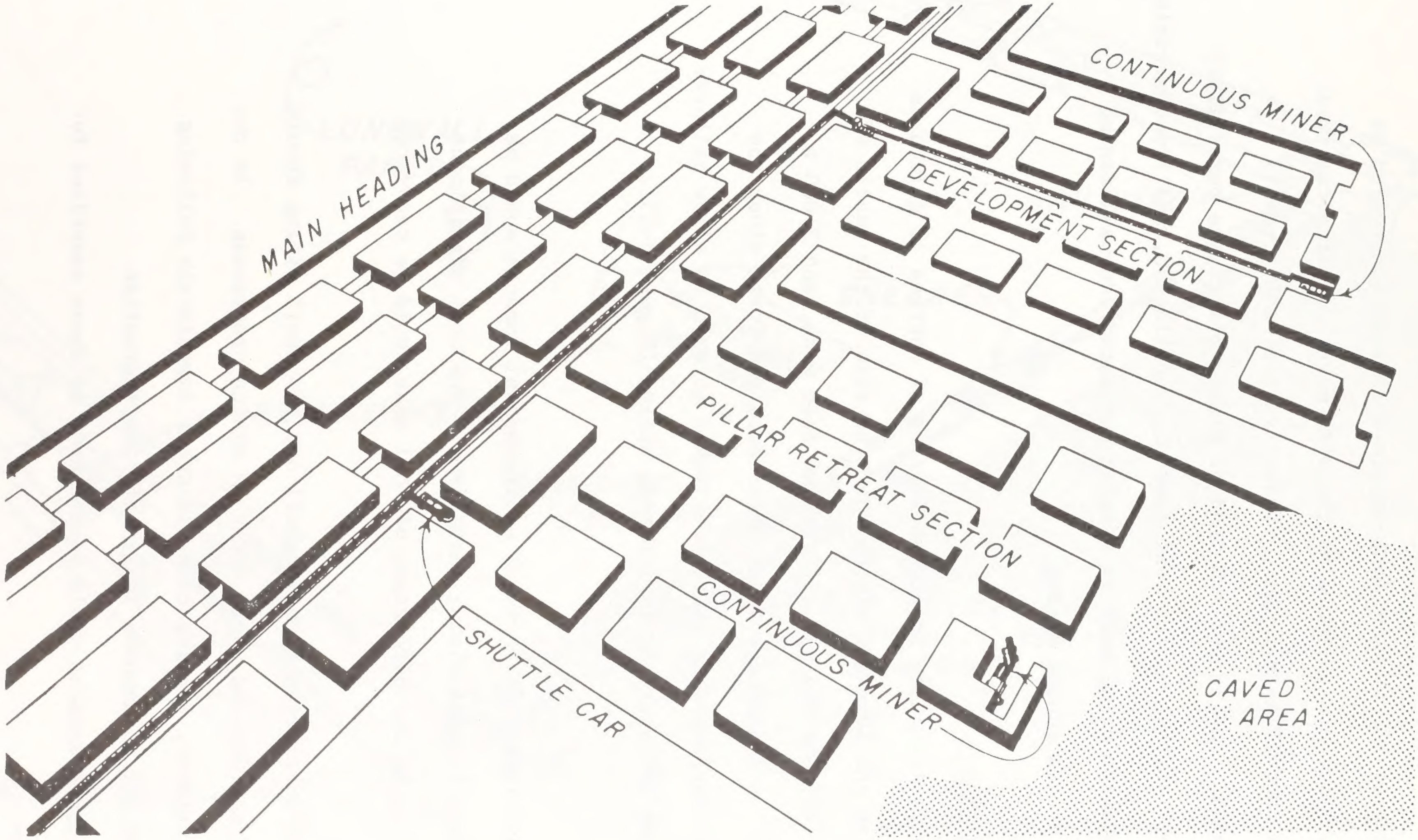


FIGURE 8-21

ROOM AND PILLAR MINING (CONTINUOUS MINING METHOD)

immediate vicinity of the working face by steel shields controlled by hydraulic jacks, which are advanced as the work moves forward; the roof collapses behind them (Figure 8-22). Productivity of the longwall method is very high. The longwall method of mining offers the possibility of improved safety through better roof control, ventilation, and transportation.

Attempts are being made to develop automated longwall mining in the same way as continuous mining.

4. Shortwall Mining

In shortwall mining an access lattice of entries is driven as in room-and-pillar and longwall mining, but the size of the panels of coal would be in between the two (100 to 200 feet wide, and 2,000 to 4,000 feet long). A continuous miner moves back and forth along the face under steel roof supports which are jacked forward to allow collapse of the roof behind the work, as in longwall mining (Figure 8-23).

5. Summary

External (outside the mine) environmental impacts would be virtually identical for all mining techniques. The most significant difference would be in the percentage of coal that could be recovered (Table 8-29).

Surface subsidence from longwall and shortwall mining should be comparatively uniform and would occur as mining progresses. In the room-and-pillar methods, subsidence could occur immediately following pillar removal or for an unknown length of time thereafter.

Unavoidable impacts would be the same as those described for the Wilberg Mine.

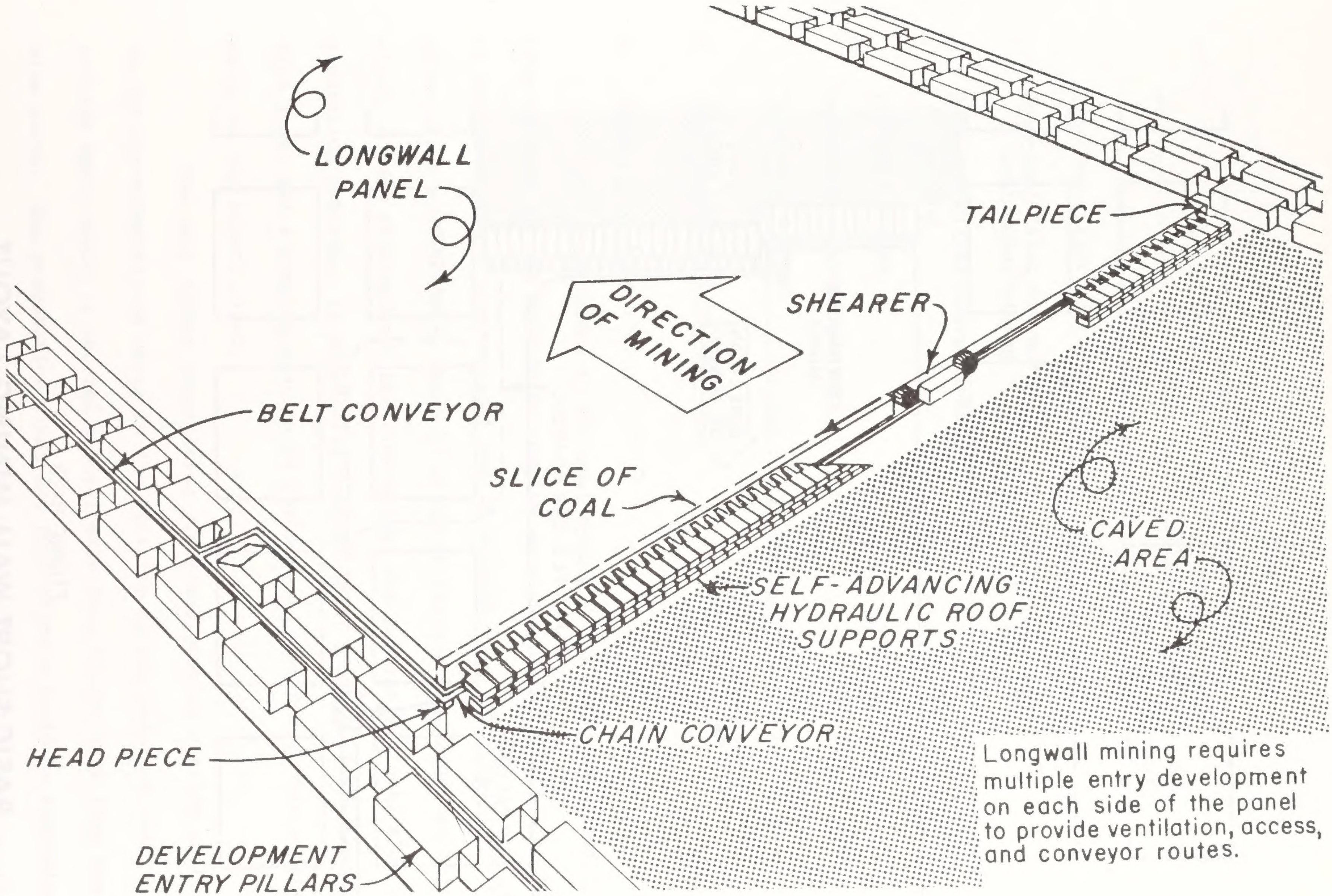


FIGURE 8-22

LONG WALL MINING TECHNIQUE

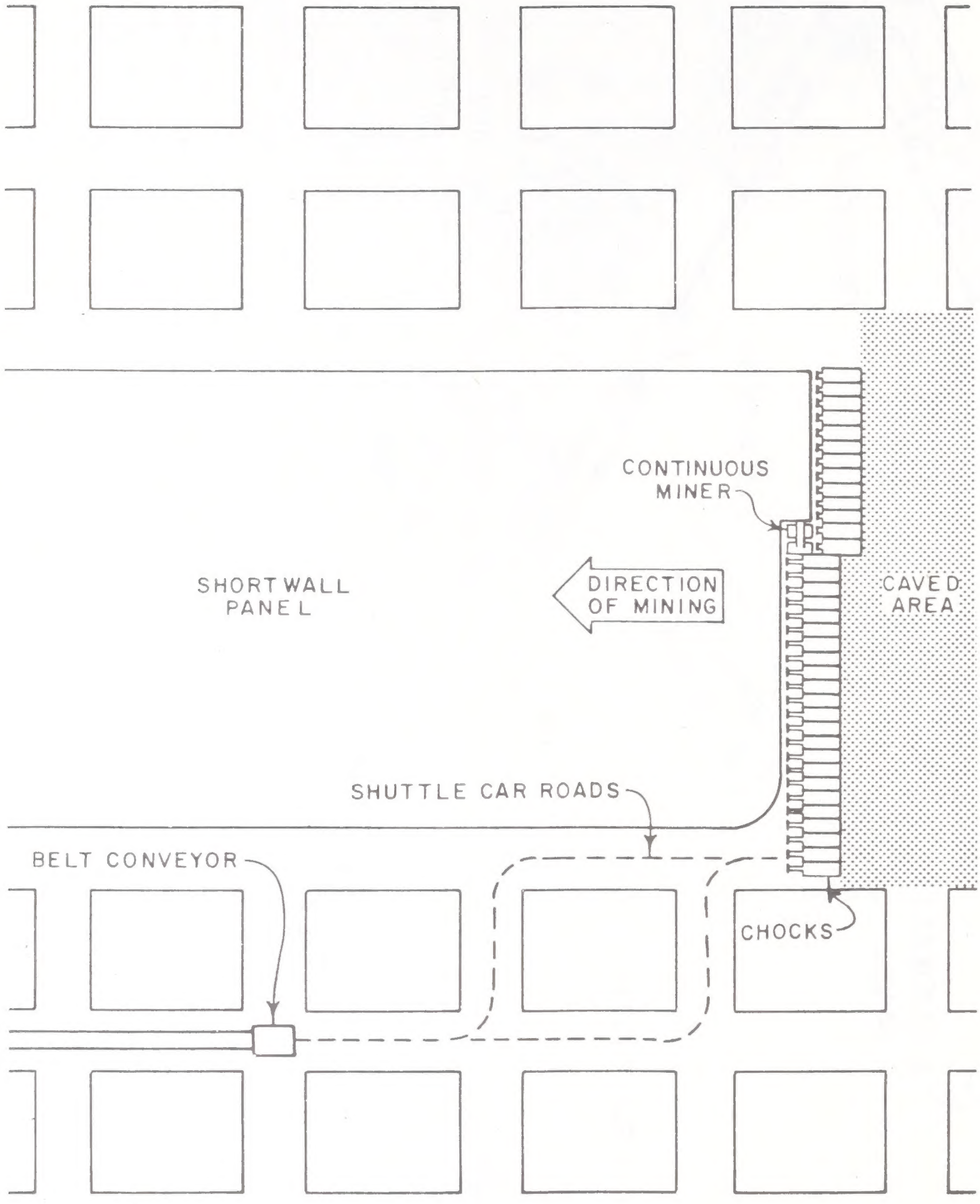


FIGURE 8-23

BASIC SHORT WALL MINING LAYOUT

TABLE 8-29

Percentage of Coal Recovery
Using Different Mining Techniques

Method	Percent Recovery
Room-and-Pillar continuous mining	50
Room-and-Pillar automated continuous mining	70
Room-and-Pillar conventional mining	50
Longwall mining	85
Automated longwall mining	95
Shortwall mining	85

F. COAL TRANSPORTATION METHODS

1. Slurry Pipe Line

This alternative to the coal system would move pulverized coal from the mine to the generating complex as a coal-water slurry consisting of approximately 45 percent coal and 55 percent water by weight. This alternative would require about 12 miles of 15-inch pipe line, a coal slurry plant, a pump station near the mine mouth, and dewatering facilities at the generating complex. It would also require about 5 miles of 10-inch water pipe line, and a pumping station at Cottonwood Creek to provide additional water to the slurry plant.

The coal slurry preparation plant and pumping station would occupy approximately 30 acres in the vicinity of the proposed coal storage yard, which is located about 1 mile down Grimes Wash from the mine mouth. The preparation plant and pump station would be approximately 90 feet tall. Several tanks would be 40 to 60 feet tall. Coal would be

moved to the preparation plant by conveyor, as presently proposed. Water would be moved from the mine to the preparation plant by pipe line. The slurry preparation plant would require approximately 5.8 MW of power per year (as scaled from other installations elsewhere).

At the generating complex, an additional settling pond having a capacity of 30 acre-feet or more, and an additional filtering system with appropriate facilities would be needed.

The mine itself would furnish up to 400,000 gallons daily, approximately 16 percent of the water needed to operate the coal slurry pipe line. A small booster pump would pump the water uphill from the coal slurry plant. The other 84 percent (approximately 1,750 acre-feet per year) could be obtained from the Cottonwood Creek Irrigation System, (see Alternative Water Sources) in which UP&L owns 5,000 water shares, ample for this use. Water pumped from Cottonwood Creek near the Swasey Diversion Dam would have to be lifted about 1,000 feet to the preparation plant site. This would require somewhat more than 0.25 MW of power per year. The water pipe line would parallel the slurry pipe line.

The coal slurry preparation plant would occupy the same area described for the coal mine and surface facilities of the proposed action. The coal slurry and water pipe lines from Cottonwood Creek would follow the same route as described for the proposed haul road.

The terrain varies from steep at the mine mouth, through rolling foothills, to nearly level at the generating plant site. The soils are of Mancos shale-derived clays. Vegetative types change from pinyon-juniper at the proposed preparation plant site, to saltbush, salt grass, and agricultural types, as elevation is lost. The primary wildlife habitat is deer winter range. Livestock grazing and irrigated crop land

are the main land uses in the area. These environmental factors are discussed more thoroughly in Chapter 2.

Impacts of the slurry pipe line and water supply line would be similar to those described for the coal haul road for the proposal. They include increased soil erosion due to the disturbance of soils and vegetation on high erosion hazard areas having less than a 50 percent probability for reseeding success. Sediment yields would increase by 70 tons per year, or 0.014 percent of the naturally-occurring loss. This increased erosion would occur until vegetation was reestablished in from 15 to 20 years.

Archaeological site damage due to constructing the slurry pipe line is expected to be the same as for haul road described for the proposal.

The slurry water requirement would also retire about 436 acres of irrigated crop land.

Federal agencies would require mitigation of the increased soil erosion impact caused by construction. They would require the Company to reseed, water bar, and eliminate unnecessary scalping or other surface disturbances. Erosion would be decreased approximately 50 percent on 41 acres of disturbed soil by applying the mitigating measures.

An unavoidable adverse impact would be an increased soil loss of about 35 tons, or 0.007 percent increase over the normal annual erosion.

Destruction of archaeological values would be mitigated by requiring the Company to make preconstruction surveys, change routes, or salvage sites as deemed necessary. The extent of the archaeological value loss is unknown, but it is estimated that it would be low or

nonexistent. Because of a lack of survey for archaeological values along the pipe line routes, the potential for mitigation is also unknown. Chapter 4 contains a more detailed discussion of mitigating measures.

2. Conveyor Belt

a. Description of Alternative

This alternative coal transportation system would move coal from the 25,000 ton live stockpile approximately 12.0 miles to the plant site (Figure 8-24). The conveyor would require a 60-foot right-of-way and would cross and occupy the following lands.

	Length (miles)	Area (acres)
National resource lands	3.4	25.0
State of Utah Lands	1.1	8.0
Private Lands	7.5	55.0
TOTAL	12.0	88.0

A 20-foot wide dirt patrol and maintenance road would be constructed within the 60-foot right-of-way.

Electrically driven belt conveyor sections would deliver coal to the generating complex. The conveyor sections would be suspended on wire ropes between supports, as illustrated in Figure 8-25.

The conveyor would be constructed a few inches off the ground, except where crossing washes or other ground depressions. To avoid conveyor grades exceeding 15 percent, it would be neccessary to make six cuts each exceeding 10 feet, to build elevated portions (creek and wash crossing and elevated terrain) at 23 locations and to install 8 culverts.

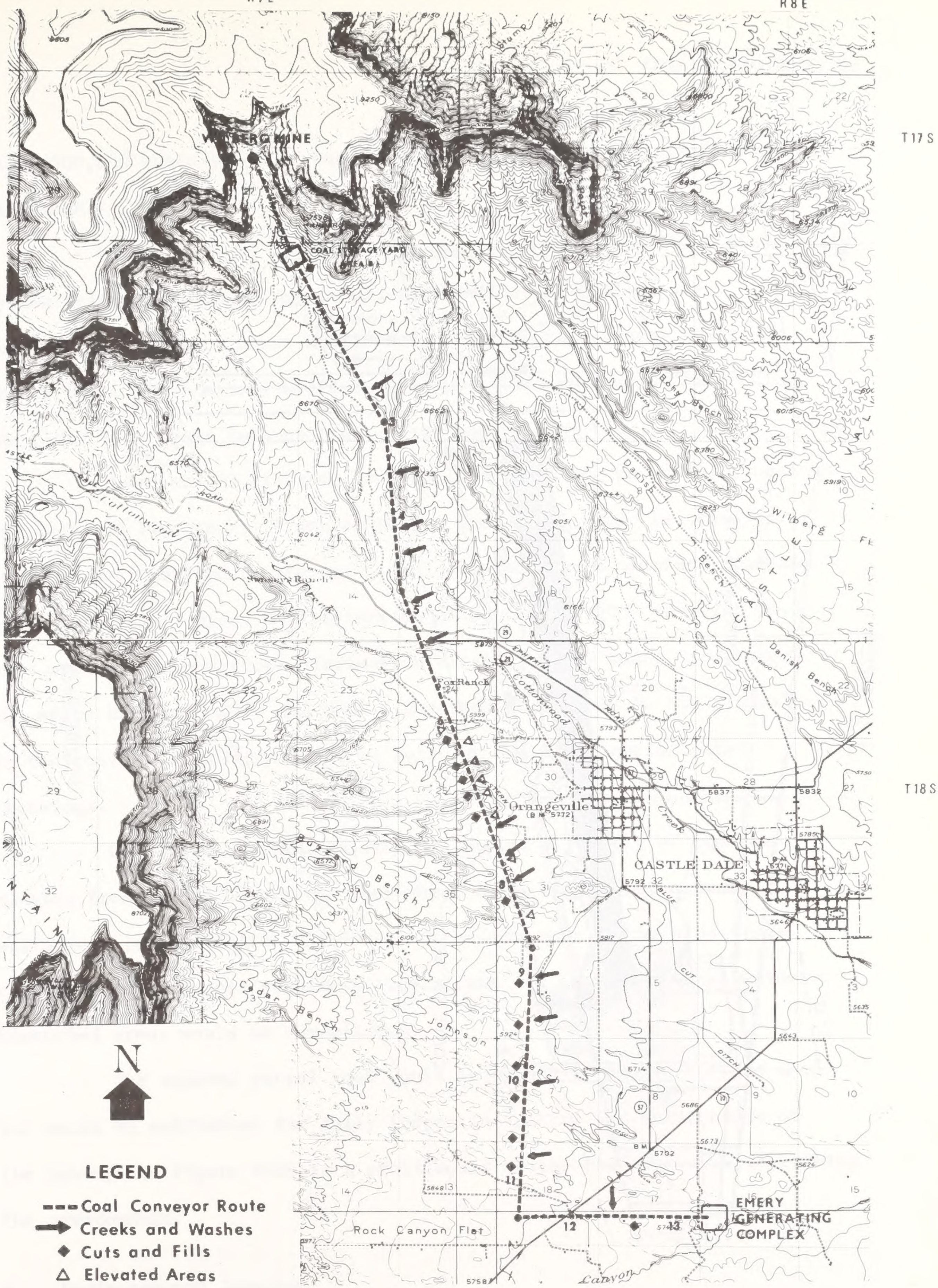


FIGURE 8-24

PROPOSED COAL CONVEYOR ROUTE

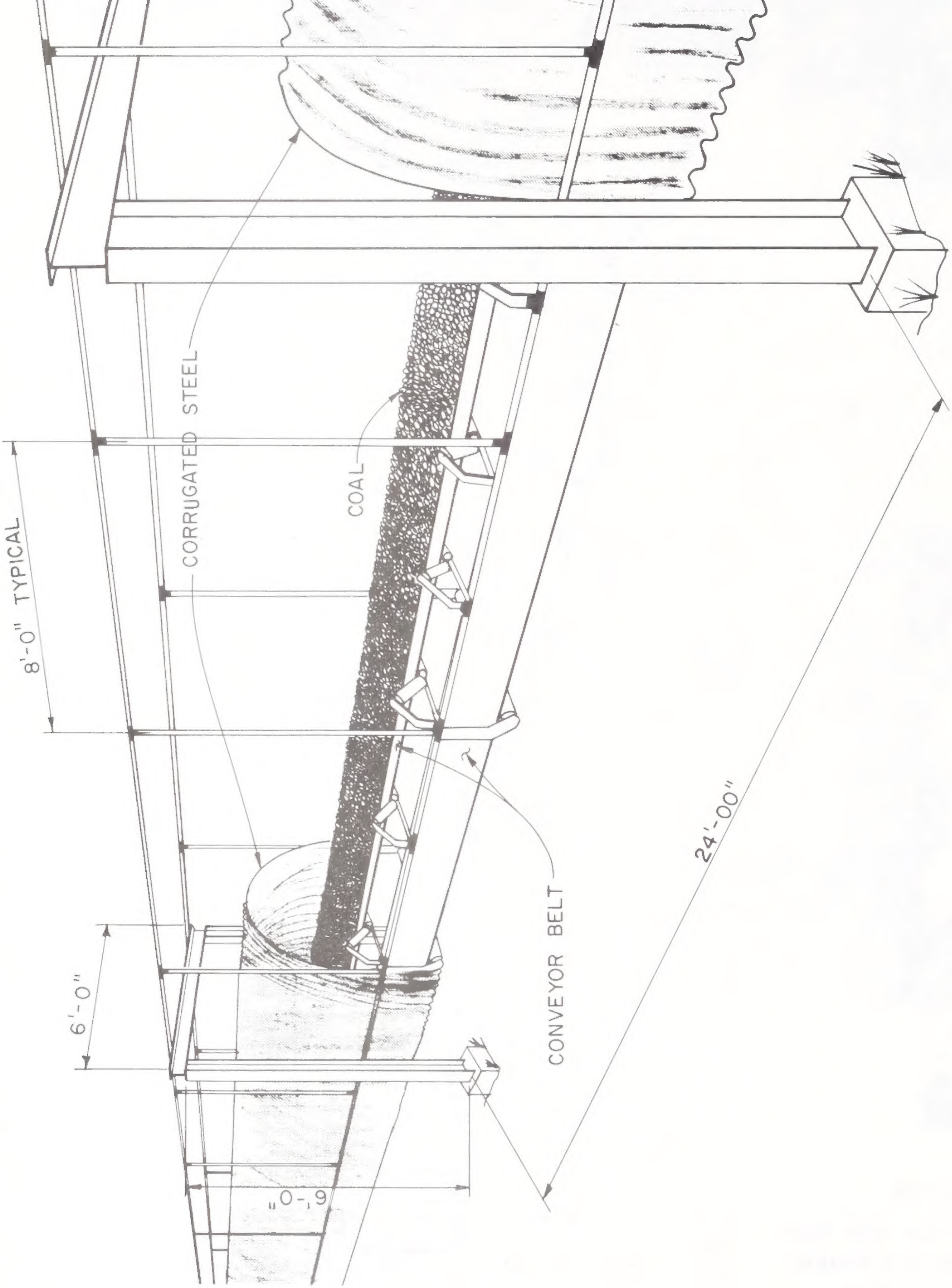


FIGURE 3-25

About 500,000 cubic yards of cuts and 200,000 cubic yards of fill would be needed.

Power would be supplied from the local UP&L 46/12.5 kV distribution system which provides energy to the Castle Dale-Orangeville area. Overhead distrubution lines would be constructed to conveyor transfer points where drive motors would be located. Through some short sections the power line would be supported on the conveyor system.

There are 23 elevated sections that could be potential crossings for deer and livestock. Transfer points where coal would be transferred from one belt section to the next, would be enclosed by a chain link fence for public safety and protection of equipment. The conveyor would pass over Cottonwood Creek, irrigation canals, county roads, and under two state highways, U-29 and U-10. A patrol road would be built parallel to the conveyor. Bridges would be built at small irrigation canal crossings.

Construction would require the use of a variety of equipment ranging from pickup trucks and four-wheel drive equipment to heavy bulldozers and carryalls. Assembly of the conveyor at the site (from component parts) would require a light crane and trailer-mounted welders. Disturbed areas would be revegetated.

The unpaved patrol road would be closed to public vehicle use but would be maintained for daily inspection patrol and maintenance of the conveyor. Figure 8-26 is a profile map of the coal conveyor describing the environment.

b. Environmental Impacts

Approximately 44 acres of land would be occupied by the coal

conveyor. This would eliminate soil and vegetation productivity on this area for the life of the project.

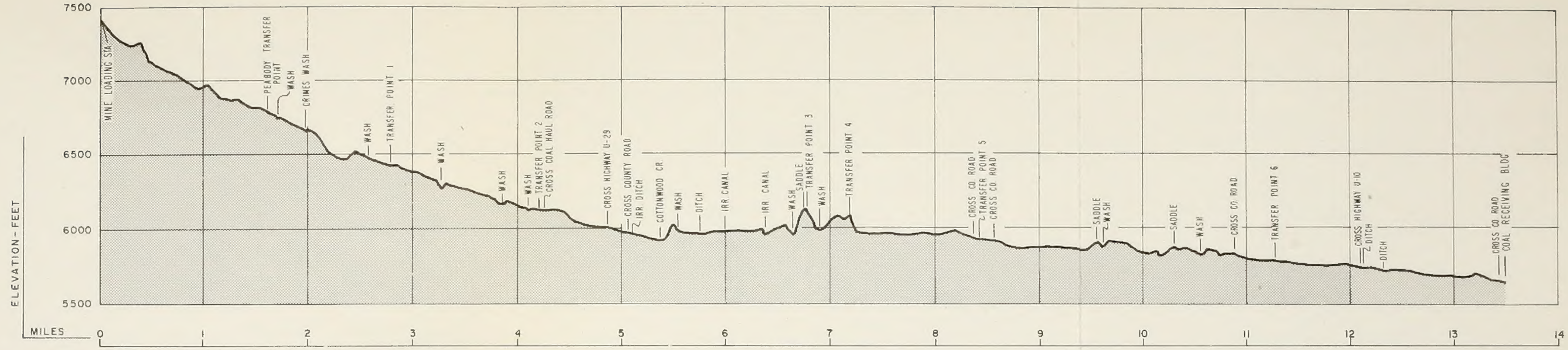
An additional 44 acres would be disturbed during construction, of which 21 acres contain soils with a high erosion hazard and low probability of successful seeding operation. An additional 13 acres have a low to moderate erosion hazard with a low probability of successful seeding operating.

With the disturbance of 21 acres with a high erosion hazard, the sediment yield would increase by some 40 tons, which is insignificant when compared to the present 510,777 tons produced annually in this area.

On 34 of the 44 acres that would be disturbed, it would take approximately 20 years to reestablish vegetative cover. The remaining 10 of the 44 total acres disturbed are irrigated crop lands, and crops could be reestablished within 1 year.

Of the 44 acres to be occupied, 10 acres are irrigated crop land, and 1 acre riparian habitat. These 11 acres provide habitat for pheasant. Loss of 11 acres habitat would reduce pheasant numbers by approximately 2 cocks, 1 breeding hen, and 6 young. The loss of this habitat would represent a 0.02 percent decrease in pheasant habitat in Emery County.

As indicated in the description of the coal conveyor there are 23 elevated sections at creek and wash crossings and elevated terrain. These elevated areas could be potential deer crossings. However, there has been little experience with such crossings in the area and their effectiveness is not known. Therefore, the potential effect on normal deer movement cannot be stated.



EROSION HAZARD: HIGH | MODERATE | HIGH | LOW | MODERATE

POTENTIAL FOR VEGETATION RECOVERY: < 30% | 50 - 70 % | < 30%

VEGETATION TYPES: Pj | At | Gw | R | At | F | At | F | At | F | At | F | At | F | At | F | At | D

WILDLIFE: D - W | R | Up | Wf, Cw | Up

CULTURAL RESOURCES: SURVEYS HAVE NOT BEEN COMPLETED - LOW POTENTIAL

SCENIC RESOURCES

- Scenic Quality: CLASS B | CLASS C
- Distance Zone: FMg
- Sensitivity Level: MEDIUM

LEGEND

EROSION	VEGETATION RECOVERY	VEGETATION TYPES	WILDLIFE	CULTURAL RES	SCENIC RES
SEE NARRATIVE	SEE NARRATIVE	C - MIXED FOREST Mb - MTN BRUSH Pj - PINYON - JUNIPER S - SAGEBRUSH G - GRASSLAND Gw GREASEWOOD At - SALTBRUSH R - RIPARIAN Ms MARSH D - SALTGRASS F - AGRICULURAL LAND A - ASPEN	E - ELK D - DEER Up - UPLAND GAME Wf - WATERFOWL Cw COLD WATER FISH R - RAPTORS Jr - JACK RABBIT Ww - WARM WATER FISH W - WINTER S - SUMMER Yl - YEARLONG	FMg - FOREGROUND, MIDDLE - GROUND Bg - BACKGROUND Ss - SELDOM SEEN SEE NARRATIVE	SEE NARRATIVE

FIGURE 8-26

COAL CONVEYOR

Surface disturbance and removal of vegetation for construction of the coal conveyor would change the landscape character. The result, however, would create a low visual impact. The elevated character of the coal conveyor would create additional contrast with the landscape character, but the contrast would also have a low visual impact.

c. Mitigating Measures

Federal agencies would require mitigation of the increased soil erosion impact and loss of vegetative cover caused by construction. They would require the Company to reseed, water bar, and eliminate unnecessary scalping, or other surface disturbances as described in Chapter 4. Erosion would be decreased approximately 50 percent on the 21 acres with a high erosion hazard. The time required for rehabilitation of vegetation on 13 acres with a low proability of success for rehabilitation could be reduced from 20 to 10 years through seeding operations.

d. Unavoidable Adverse Impacts

An unavoidable adverse impact would be that soil and vegetative production on the 44 acres occupied by the coal conveyor would be lost during the life of the project.

An increased soil loss of about 20 tons would occur. This represents a 0.004 percent increase over the normal annual erosion.

Vegetative production would be reduced on 44 acres disturbed during construction. Vegetative production would be lost for 1 year on 10 acres of irrigated crop land and for 10 years on 13 acres with a less than 50 percent probability of seeding success in moderate to low erosion hazard areas. It is estimated that 20 years may be needed to restore

vegetative production on the 21 acres disturbed (on highly erosive soils) with less than 50 percent chance of range seeding success.

Construction of the conveyor belt would remove 10 acres of irrigated crop land and 1 acre of riparian habitat used by pheasants. Loss of habitat would reduce pheasant numbers by approximately 2 cocks, 1 breeding hen, and 6 young. Such losses would represent a 0.02 percent decrease in pheasant habitat in Emery County. The impact would exist for the life of the project.

The coal conveyor would create a visual intrusion by damaging the soil mantle and vegetative resource, leaving scars on the landscape that would diminish in time through revegetation. The conveyor would also introduce a strong visual contrast. While this linear feature could be designed to blend into the landscape, it would still interrupt the natural character which would be noticeable. This feature would be seen for about 7 miles along Highway U-10.

G. WATER TRANSPORTATION METHODS

The only other viable method of transporting water from Millsite Reservoir to the generating complex is by open ditch or canal. Although this alternative method is technically feasible and could be reasonably implemented, it does not enhance environmental quality or avoid adverse impacts created by the proposal. The ditch or canal would be 3 to 4 miles longer than the pipe line. It could add a watering place for wildlife, although there is no shortage of watering places in the immediate vicinity.

H. WATER SOURCES

A secondary, as well as alternative water supply for the Emery

generating proposal (supplying the slurry pipe line, scrubber, and wet cooling tower), is the Cottonwood Creek Drainage, which includes Joes Valley Reservoir. UP&L has contracted with the Emery Water Conservancy District for 6,000 acre-feet per year of Emery County water from Joes Valley Reservoir in the upper Cottonwood Creek drainage basin for the project. In addition, UP&L has purchased 5,000 water shares (about 5,000 acre-feet per year) from individual shareholders of the Cottonwood Creek Consolidated Irrigation Company. Originally this water was procured for the Huntington Units 3 and 4 but could be partly diverted to the Emery plant, to provide an additional 7,000 acre-feet per year for the wet cooling tower and SO_2 scrubbers.

A raw water pipe line would be constructed from the Swasey Diversion Dam on Cottonwood Creek to the Emery plant. The pipe line, about 8 miles long, would parallel the haul road as described in Chapter 1, and would be constructed in the same right-of-way from Cottonwood Creek to the generating complex. Crossings of intermittent streams and washes would be underground. The pipe line would be similar in size to the one proposed from Millsite Reservoir as described in Chapter 1. A pumping station would be required at the Swasey Diversion Dam, to which power would probably be supplied from the same power line used by the Wilberg Mine. At present, the 7,000 acre-feet in Cottonwood Creek is used to irrigate 1,785 acres of agricultural land.

The environment for the water pipe line would be the same as described in Chapter 2 for the proposed haul road. The pipe line would be constructed in the haul road right-of-way as described in Chapter 1, and would run from Cottonwood Creek to the generating complex.

The removal of 7,000 acre-feet of water would create similar impacts as described for the water from Millsite Reservoir (Chapter 3) in relation to the loss of irrigated crop land and marketable beef. It should be understood, however, that this impact would be in addition to the Millsite water impact, and not merely replace it.

Even though no significant adverse impacts would occur from burying the water pipe line in the proposed coal haul road right-of-way, the Company would be required by federal agencies to avoid unnecessary disturbance, and to reseed as described in Chapter 4.

The 7,000 acre-feet of water removed from irrigational use would result in the loss of 1,785 acres of irrigated crop land with an accompanying loss of 481,050 pounds of live weight marketable beef.

I. TRANSMISSION LINES

1. Location of Corridors

a. Spanish Fork Modification

Prior to and during 1975, four alternative corridors were analyzed for lines from the east side of the Wasatch Plateau (Carbon-Emery County area) to the west side of the plateau (Wasatch Front). These corridors were identifed as Hogan Pass, Salina Canyon, Manti Top, and Spanish Fork Canyon. This report is available, and can be obtained from the Bureau of Reclamation, 125 South State Street, Salt Lake City, Utah, 84111. The report generally indicated that all corridors were viable, but that their use would result in a proliferation of power lines. Nevertheless, through subsequent decisions three of the four corridors have lines in them, and of the four, Hogan Pass is a prime

route for the lines proposed from the IPP generating station near Caineville, Utah.

There are now two 138-kV lines, a 46-kV line, a telephone line, double-track railroad, and paved two-lane highway through the Emery-Spanish Fork Canyon-Camp Williams corridor in Spanish Fork Canyon. The first modification would be to route the Emery-Spanish Fork Canyon-Camp Williams line into a 345/138-kV substation near the Carbon plant at Castlegate, Utah as shown in Figure 8-27. The Carbon plant could thus be connected to the 345-kV line eliminating the need for the two existing 138-kV lines. These could be dismantled. This routing could extend 12 miles to the Emery-Spanish Fork Canyon-Camp Williams line described in Chapter 1.

This Spanish Fork Canyon line would be the same as for the proposed Emery-Spanish Fork Canyon-Camp Williams line except for the segment of the line between the North Fork of Gordon Creek and Soldier Summit (mile 35 to 55, Figure 1-26; and Appendix VI-3). Of the 32 miles of this line, the route would follow 10 miles similar to that described from Huntington Creek to the North Fork of Gordon Creek, and 22 miles would be similar to the line from Soldier Summit to the Spanish Fork substation.

Adverse impacts would be the same for similar portions of the proposed transmission line. These impacts could be mitigated as described under the proposed action.

The alternative would mitigate many adverse impacts identified for the proposal, which include the following:

Twenty miles of deer and elk winter range would be avoided.

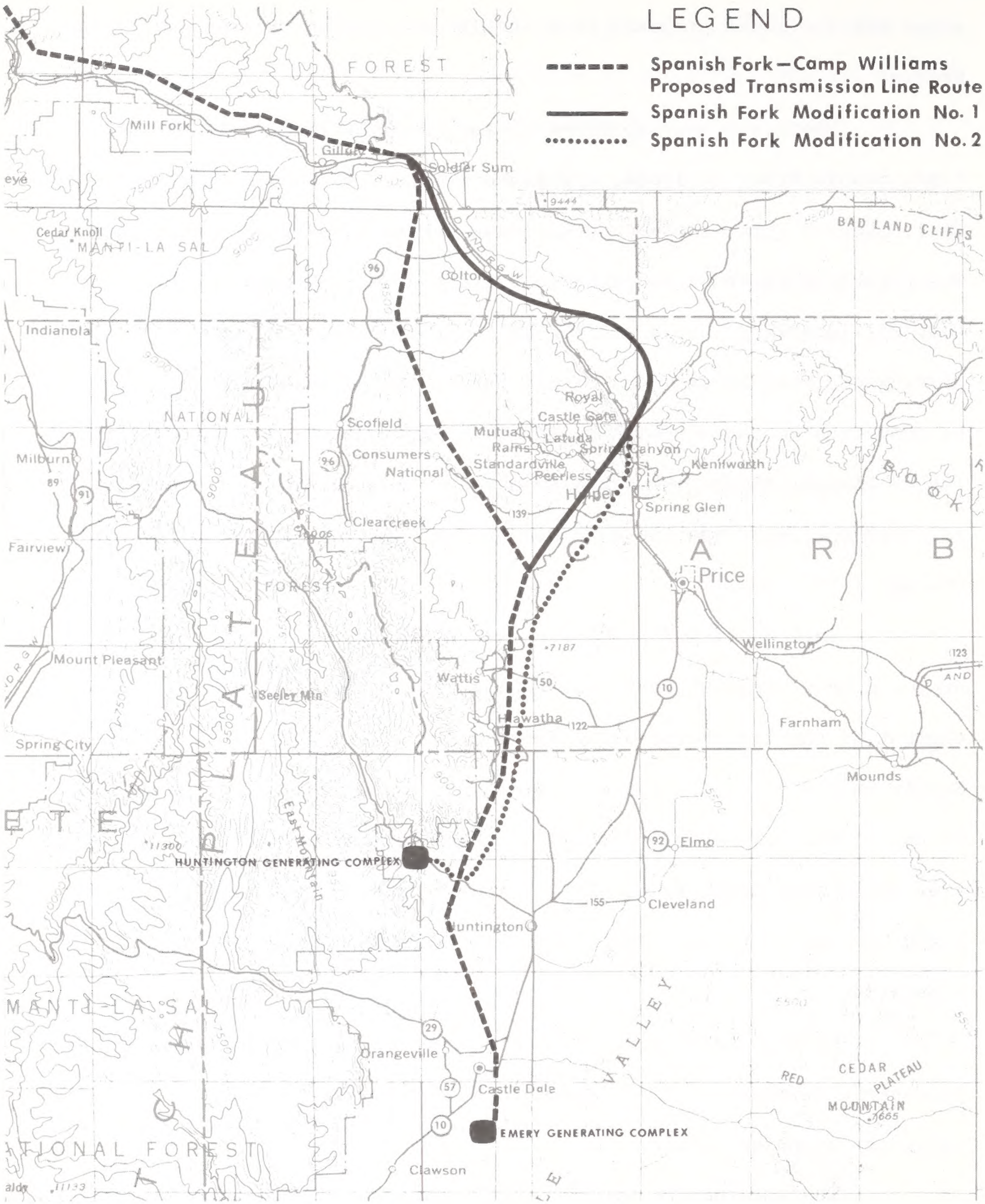


FIGURE 8-27

SPANISH FORK–CAMP WILLIAMS MODIFICATIONS 1 AND 2

Fifteen miles of deer-fawning and elk-calving range would be avoided.

Forty miles of access road into a presently inaccessible area would not be necessary, therefore not disturbing wildlife habitat.

No damage would occur to major water-yielding areas on Wasatch Plateau.

Recreational around Scofield Reservoir would not be impacted visually by construction of a transmission line.

Four large transmission lines could be eliminated from an already congested canyon.

The same mitigating measures would apply as described in Chapter 4. However, a close look at the beneficial impacts listed previously show that mitigation needs are not as many as with the proposal.

Impacts on scenic resources in terms of contrast would remain, especially along the highways.

A second modification would be to construct two heavy 138-kV lines from Carbon power plant to reach a 138/345-kV substation at Huntington, thus connecting the Carbon plant to the Emery-Spanish Fork Canyon-Camp Williams 345-kV line. This proposal could be implemented by rebuilding the existing Huntington-McFadden-Helper 138-kV line, and construction of a new parallel 138-kV line from Huntington to the Carbon plant. The two 138-kV lines from Spanish Fork to the Carbon plant could be removed. This plan would eliminate some of the transmission lines in Spanish Fork Canyon, but would add 20 miles of line in the Huntington to Carbon plant area. The 20 miles of transmission line would pass over an area similar to that described from Emery to Huntington along the proposed route (Appendix VI-3, mile 0 to 15).

Impacts would be similar to those described for the proposed line from Emery to Huntington Creek.

Two existing 138-kV lines in a congested corridor from Spanish Fork to Soldier Summit would be eliminated. The same mitigating measures would apply as described in Chapter 4.

Impacts to scenic resources in the form of contrast would remain throughout Spanish Fork Canyon.

b. Provo Area

(1) Middle Route

This alternative transmission line route would follow the proposed route to the point of its crossing of I-15 near Provo Bay. Figure 8-28 shows the proposed routing of this alternative through the Provo area. The length of the alternative segment from Provo Bay to Powell Slough would be approximately 6 miles. Poles would be of mono-pole design as shown in Figure 1-28.

The route would cross lands zoned R-1 Residential, R-A Residential Agricultural, A-1 Agricultural, and P-F Public Facilities (Figure 2-31). The area zoned P-F north of the Sunset Elementary School, is proposed for a park development by Provo City. Projected land use patterns show accelerated residential development in the area of this alternative route. The environment of this route is basically the same as described for the proposed route (Provo Transmission Line Segment).

Environmental impacts on this route would be similar to those described for the proposed route. The proximity of 2 miles of transmission line along the north side of Provo Bay would increase the flight hazard to birds in that area. This alignment would place one tower on the UDWR access road on the east side of Provo Bay. This tower would block

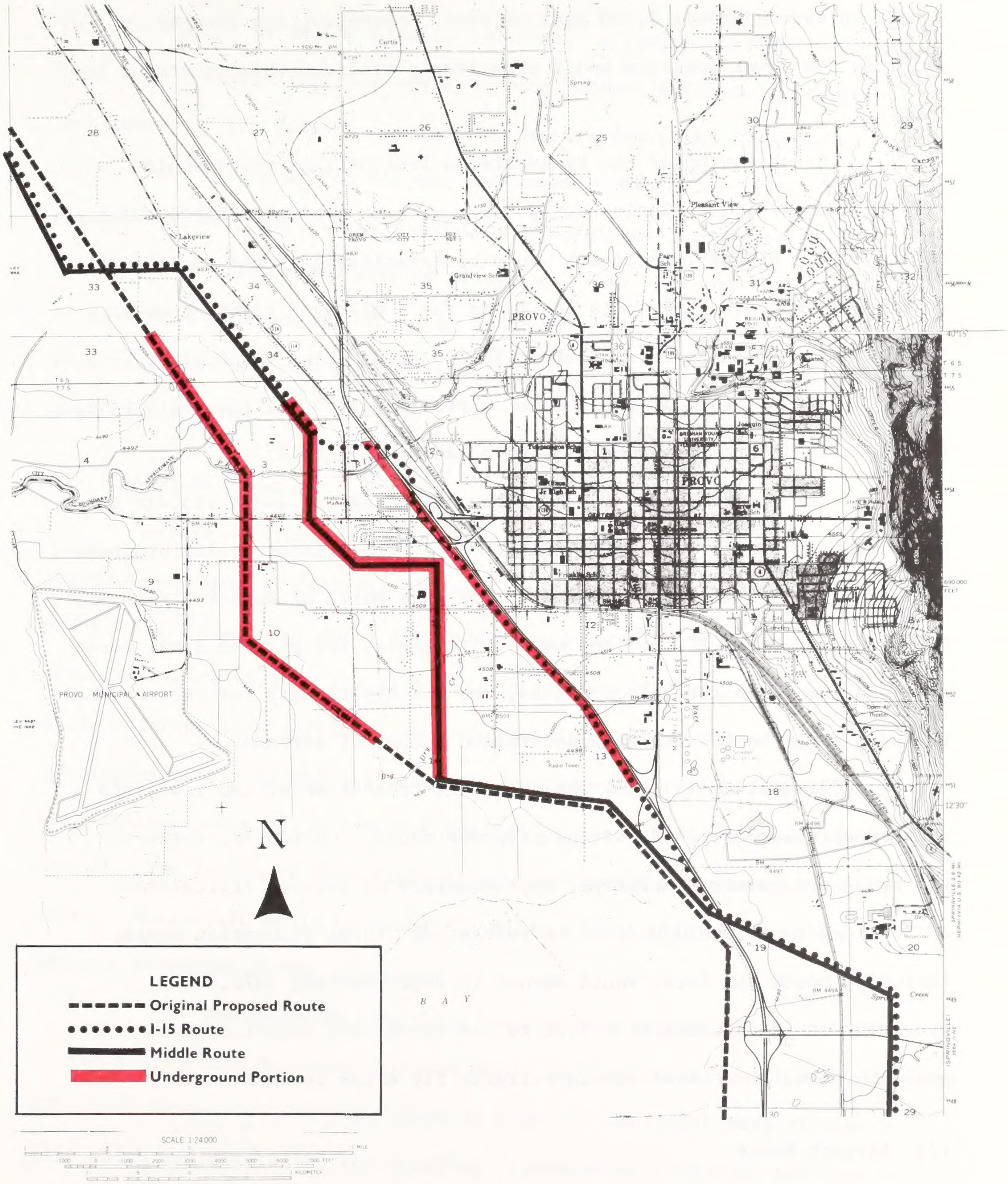


FIGURE 8-28

ALTERNATIVE TRANSMISSION LINE ROUTES - PROVO AREA

access on approximately 1,250 feet of road. Rerouting the road or shifting the tower location would effectively mitigate this adverse impact.

Construction of the transmission line on this route would require removal of 15 single-family homes with an estimated total value of $750,000. A long-term impact would be foreclosure of the opportunity to develop 165 lots that would be within the 3 miles of right-of-way. Present value of those lots is about $8,000 each. Land value plus $42,000 house on each lot would total approximately 9 million dollars of lost opportunity for residential development (Appendix X).

The entire length of this Provo City segment would violate the proposed Utah County zoning ordinance. Under the present zoning ordinance, utility lines would not be allowed in the area north of Sunset Elementary School, zoned P-F. If the line were built there, the planned development of a park would be altered or denied, and the opportunity for recreational pursuits would be lost to an undetermined number of persons.

Removal of 15 homes would require relocation of the residents with impacts as described for the proposed route. Currently, three of the homes are vacant; therefore, approximately 42 persons (calculated at 3.51 per home) would have to be relocated. Total relocation costs, including homes and lots, would amount to approximately $870,000. Proximity of the transmission line to the elementary school grounds would increase the hazard should children fly kites in that area.

(2) Airport Route

The closeness of this route to the Provo City airport (Figure 8-28) would require that a significant part of this route be underground

in order for it to be technically feasible. A preliminary notification that this transmission line would violate Federal Aviation Regulations was issued by the Federal Aviation Administration (FAA) on November 28, 1975. This ruling by the FAA was confirmed on March 23, 1976. The FAA stated, "Accordingly, it is found that the proposed transmission line would have a substantial adverse effect upon the safe and efficient use of navigable airspace and would be a hazard to air navigation." Consequently, this route was not considered a viable alternative for an overhead transmission line.

(3) Goshen Bay Route.

This alternative route would depart from the proposed route at the proposed Spanish Fork substation in the east half of Section 27, T. 8 S R. 3 E. From that point the route would pass southwestward as shown in Figure 8-29 to the existing Sigurd-Camp Williams corridor. After entering this corridor, the route would parallel the existing line for approximately 33 miles to the Camp Williams substation. The Sigurd-Camp Williams corridor has been described as part of the proposed transmission system. The length of this alternative route would be approximately 58 miles. This route would be almost 22 miles longer than the proposed or other alternative routes analyzed.

The transmission line from the proposed Spanish Fork substation to the Sigurd-Camp Williams corridor would be constructed using approximately 130 steel mono-pole towers as shown in Figure 1-28. That part of the line which would parallel the existing transmission line into the Camp Williams substation, would be built using approximately 168 lattice-type towers as shown in Figure 1-27. Approximately 800 additional tons of

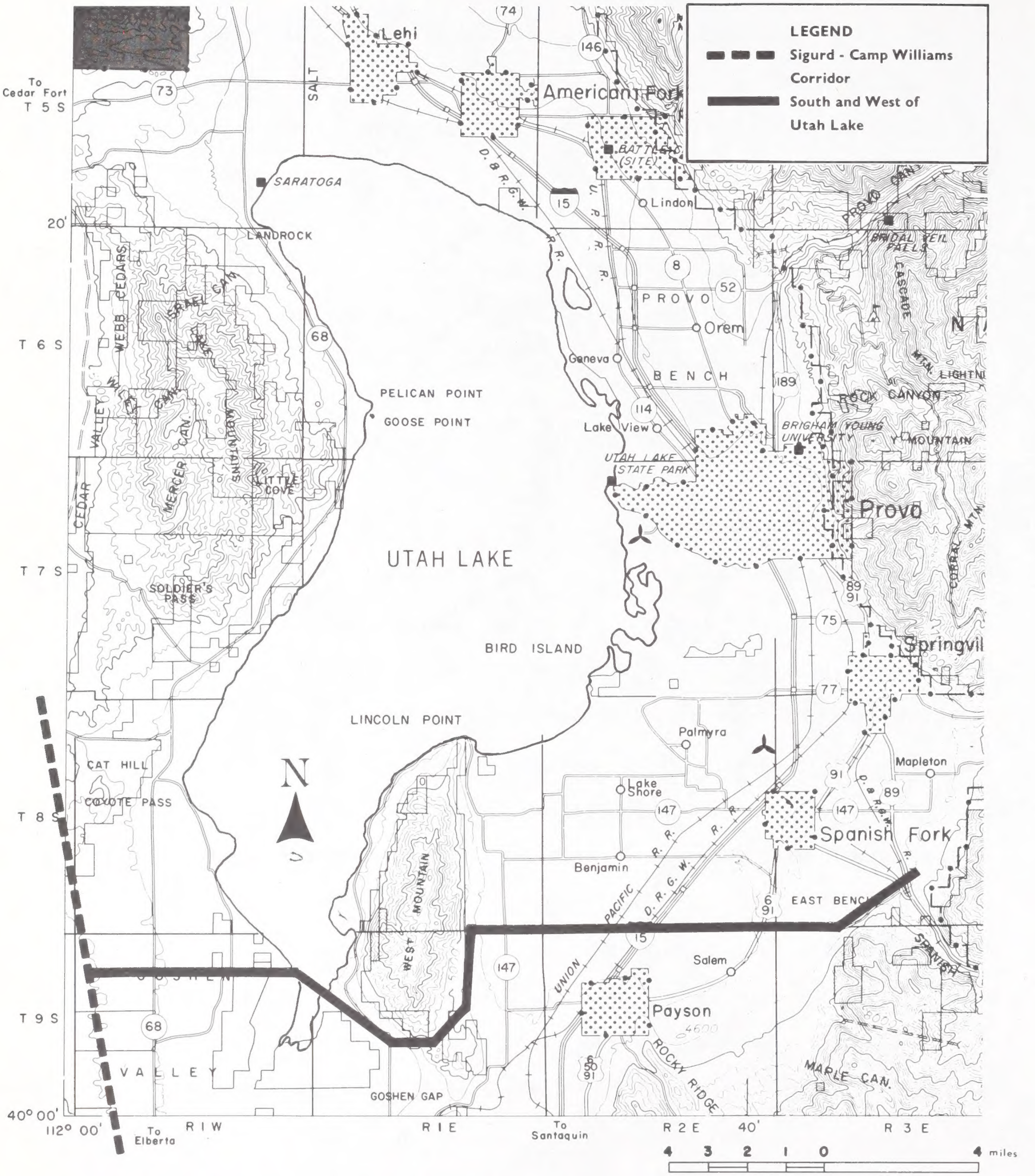


FIGURE 8-29

TRANSMISSION LINE GOSHEN BAY ROUTE

steel would be required on this route over the proposed or alternative routes analyzed.

The environment of this route from the Spanish Fork substation to the Sigurd-Camp Williams corridor consists of approximately 13.5 miles of agricultural crop land, orchards, and grass pasture. The remaining 11.5 miles is juniper-sagebrush range land and saltgrass-alkali flats. The route would cross Goshen Bay, an area used year round by waterfowl. During the winter, the open water area there attracts over 5,000 ducks (Jensen, 1974). This area is also an important resting area for Canada geese attracted by farms south and west of the lake. During the fall of 1975, UDWR personnel counted 4,500 Canada geese using the Goshen Bay area (Eyre, 1976). There are no known threatened or endangered animal or plant species present in the area of the route. Migrant American peregrine falcons and northern bald eagles have been observed in areas near Utah Lake.

Cultural remnants found in the Goshen Bay area are predominantly Fremont with possibly some late-Ute. Sites consist of lithic scatters, stone implements, pottery fragments, permanent habitation sites, and campsites (Berge, 1976). No national historic sites are known to be present in the area.

The alternative route would cross U.S. Highway 6 - 50 at the mouth of Spanish Fork Canyon, U.S. 6 and 91 north of Salem, I-15 north of Payson and U-68 north of Elberta. This alternative transmission line would be viewed by approximately 44,340 persons daily on the four highways crossed (Utah Department of Highways, 1975). The route would cross lands zoned by Utah County as A-1 agricultural, RA-1 residential-agricultural,

G-1 grazing, C-1 commercial, and FP-1 flood plain. Under the existing zoning ordinance, transmission lines would be allowed in all of these zones except C-1 commercial. No homes or other buildings would be within the right-of-way of this route.

Environmental impacts resulting from construction of the transmission line on this route would be similar to those described for agricultural areas of the proposed route. Installation of the towers in the West Mountain area would cause some disturbance of the erosive soils there. This would be a short-term adverse impact affecting a small area (1,656 square feet) on a landscape already disturbed by roads, ORV trails, gravel pits, garbage dumps, and mining prospect holes. The towers in this area would provide hunting perches for birds of prey in an area where few tall trees exist. However, the presence of towers near the road over West Mountain could increase the indiscriminant shooting of raptors in that area by hunters or "plinkers" (Ellis, et al., 1969).

Construction of the transmission line in the Goshen Bay area would impose an additional flight hazard to waterfowl and shorebirds using that area. Some losses due to collision with the towers or conductors would occur. The extent of such losses cannot be predicted; however, the losses would not have a long-term adverse effect on populations in the area.

An archaeological investigation of this route has identified one cultural site within the corridor. This is a multiple occupation site of Fremont and possibly late-Ute affiliation (Berge, 1976). Construction of the transmission line would adversely impact the cultural

values present, but application of mitigative measures as described in Chapter 4 would reduce or eliminate such an impact.

The appeal of the natural landscape in the Goshen Bay area would be lessened by the transmission line bisecting the area. This impact would affect mainly local residents and some boaters on Utah Lake.

Present Utah County zoning ordinances would not allow transmission lines in the area zoned commercial near U.S. Highway 6-50 in the mouth of Spanish Fork Canyon. Therefore, a variance would have to be obtained or the route changed to avoid that area. Also, this route would not be allowed (for most of its length) under the proposed zoning ordinance now under consideration by Utah County.

If farming was allowed within the 120-foot corridor, impacts to agriculture would be limited to the inconvenience of cultivating and harvesting around the tower pads. If farming was not allowed, approximately 250 acres of agricultural lands would be removed from production with an annual loss of up to $100,000 in value (Hollenbaugh, 1976). Present value is approximately $1,000,000.

The present of the transmission line in the rural, agricultural area would impose a permanent electrocution hazard to children flying kites and farmers working with long lengths of sprinkler pipe in the immediate vicinity of the line. Utah Power and Light has indicated in conversations with BLM that no accidents involving sprinkler pipes or kites have occurred during the history of the Company (Thurgood, 1976b).

2. Design Considerations

a. 500-kV Alternating and Direct Current Lines

A 500-kV line is capable of carrying approximately two and

one-half times the amount of power of a single 345-kV line. Theoretically one 500-kV line could replace two 345-kV lines strictly on the basis of capacity. However, system reliability would be less with one 500-kV line since the hazard of its loss would represent double the power lost to the system. The 500-kV towers are from 140 to 150 feet high.

Direct current (d.c.) lines have several technical advantages over alternating current (a.c.) lines. One is that only two conductors are required instead of three required for a.c. lines. Therefore, the direct current structures are less massive and less right-of-way width is required for the line itself. Secondly, d.c. lines are free from the effects of inadvertant power flows. Only the intended amount of power flows over the line. Thirdly, they can function at half power for short periods of time with only one conductor in service by using the earth as a return path.

Two of the disadvantages of d.c. lines are that a d.c. line cannot immediately carry additional loads (resulting from the outage of parallel transmission lines) and also d.c. lines provide less system flexibility because the expense of converter stations generally precludes connecting d.c. lines to an a.c. network at intermediate points.

One 250-kV d.c. line would have the capability of transmitting the total output of both units of the Emery plant.

A 500-kV line could conceivably be built in one of the same corridors where the proposed lines would be located. Chapter 2 gives a complete description of this environment.

Construction of 500-kV lines would impact scenic quality (contrast) where the line is visible from highway or recreational areas

(Chapter 3). Along either transmission route the impact would be greater in Salina Canyon where lines of two different sizes would exist. The scenic quality of either corridor would be reduced due to visibility of the structures.

One transmission line (instead of the two currently proposed) would be required. This eliminates the need for a line in either the Emery-Spanish Fork Canyon-Camp Williams corridor, or the Emery-Salina Canyon-Sigurd corridor.

The same mitigating measures would apply to this alternative as described for this section of the proposal in Chapter 4.

An impact on scenic quality in terms of contrast where the line would be viewed from highway and recreational areas would occur. Towers for 500-kV lines are taller (150 feet) than 345-kV towers (90 feet) and would have a greater tendency for skylining, making them more visible.

b. Double Circuit 345-kV Alternating Current Line

Double circuiting consists of having two separate transmission lines on each transmission structure. This makes it possible to transmit twice as much power over the same right-of-way required for a single circuit line of equal voltage.

Since a double circuit structure supports three sets of conductors, (six in total), these structures are by necessity quite massive (approximately 140 feet to 150 feet tall). Also the reliability of double circuit lines is less since both lines are often affected by the same hazards (such as icing, aircraft collision, and lightning).

A double circuit line could conceivably be built in either

corridor included in the proposal.

Construction of 345-kV double circuit lines would impact scenic quality (contrast) where a line would be visible from highway or recreational areas along either transmission route (Chapter 3). The impact would be greater in Salina Canyon where two different size lines would exist. The scenic quality of either corridor would be reduced because of the size of these structures. Scenic quality impacts in terms of contrast where the line would cross highways and recreational areas would also occur.

Only one transmission line would be required, eliminating the need for a line in either the Emery-Spanish Fork Canyon-Camp Williams corridor or the Emery-Salina Canyon-Sigurd corridor.

The same mitigating measures would be applicable as described for the Emery-Spanish Fork Canyon-Camp Williams line in Chapter 4.

c. Underground 345-kV Alternating and Direct Current Lines

(1) General

An underground a.c. transmission line would consist of three insulated conductors - each in a pressurized oil or sulfur hexafluoride (SF_6) gas-filled pipe with 2,400 ampere capacity. Each pipe would be approximately 15 inches in diameter. The underground cable system would require a 55 foot right-of-way. Of this, 15 feet would be required for the cable itself and the balance would be needed for installation and maintenance. The cable trench would be 64 inches deep, 6 feet wide, and the top of the cable shell would be 40 inches below grade. A termination structure, costing $23,000 occupying approximately 1 acre, would be

required at each end of the underground section. At the designed loading of 828 MW there would be a loss of 21 watts per circuit foot.

Utah Power and Light Company estimates $2,100,000 per mile for installation of this type of underground line. This cost includes the two required terminal stations.

The following table (8-30) was extracted from a report prepared for a symposium in 1976 (Miller, 1976).

TABLE 8-30

Underground Transmission Costs

Type of Cable	Voltage (kV)	Power (MVA)	Estimated Costs ($/MVA mi)	Estimated by
SF_6 insulated	345	4,000	500	
	750	10,000	380	ITE
SF_6 insulated	230	600	1,600	H.V. Power
	345	1,200	1,100	Corporation
	500	2,200	700	
	750	4,000	530	
	1,000	7,500	320	
SF_6 insulated forced cooled	345	4,000	350	H.V. Power Corporation
	500	6,000	300	
	750	10,000	230	
	1,000	15,000	200	

Costs in the above table do not include terminal stations.

There is a general agreement that going underground is approximately 12 times more costly than above ground.

This means of transmission has the obvious advantage of eliminating the visual impacts of towers and overhead conductors. Also, it would not be

subject to physical damage such as that from aircraft, gunfire, or lightning. Normal agricultural and recreational activities, and parking facilities would be allowed in the right-of-way. Permanent structures, trees, or other obstructions would not be allowed.

Experience with underground transmission at 345-kV or greater has been very limited, being confined to short distances in congested metropoliton areas or near hydroelectric plants. Due to this limited application, little is known about the reliability of long distance, high voltage underground transmission. A more practical application would be to underground short sections (up to 3 miles) of transmission lines. Faults of underground conductors may be more difficult to locate, and certainly more difficult to repair. The underground cables require constant monitoring; therefore, access must be assured.

Underground d.c. transmission would also consist of conductors in an oil or gas-filled pipe, similar in size to the underground a.c., except that only two conductors would be required. The same technical advantages and disadvantages listed for overhead d.c. lines would also apply to underground d.c. lines.

High voltage underwater d.c. lines have been employed in several places around the world. Two of these lines are found between England and France, and between the northern and southern islands of New Zealand.

Although underground lines offer many advantages, environmental impacts are high in terms of complete soil disturbance and total vegetative removal for the entire length of the corridor. In addition, no underground line has ever been constructed for the total length of 118 miles. The

entire 118 miles would be laid underground similarly to the laying of a pipe line. Soil and vegetative disturbance would occur on approximately 114 acres.

Federal agencies could mitigate increased soil erosion impacts caused by construction activity by requiring the Company to revegetate, water bar, eliminate unnecessary scalping, and limit other surface disturbances.

Destruction of archaeological values could be mitigated by requiring the Company to make preconstruction surveys. Routes could be changed or sites salvaged if necessary. Chapter 4 contains a more detailed discussion of these mitigating measures, and the mitigation would be the same for any proposed construction activity.

Impacts to aesthetics from burying the line would be unavoidable. Scars from burial of this type of line would remain visible for decades.

(2) Specific

(a) Underground I-15 Route

This alternative would follow the proposed route as described in Chapter 1. However, a 3-mile section of line would be underground from approximately University Avenue interchange to a point approximately 1,000 feet west of where the route would cross U-114 (Figure 8-28). The environment would be as described for the proposed route.

Environmental impacts resulting from having 3 miles of the proposed route underground would have positive and negative effects. Construction of the underground segment in the I-15 right-of-way would

eliminate the need for removal of 19 homes. Only three homes would be removed near the U-114 crossing, and the 55 foot right-of-way would eliminate the opportunity for development of seven additional lots. At a value of $50,000 each (lot and house), this would amount to a total of $500,000 in present and future residential values lost. Approximately 11 persons would have to be relocated. Planned development of a nursing home and condominium project could continue. Adverse impacts on aesthetic values due to an overhead line would be eliminated for that part of the line placed underground.

Hazards to children flying kites and persons working with long metal objects would be eliminated along the underground portion of the line. The presence of the underground line would preclude use of part of the right-of-way (approximately 2.27 acres) for any permanent structures or trees. The remainder of the line would be within the freeway right-of-way where such use is already denied. The terminal structures at each end of the underground segment would permanently occupy approximately 2 acres.

(b) Underground Middle Route

This alternative would bury a 3-mile segment underground of the Middle Route previously described as overhead line. This segment would begin at the turning point in Section 14, T. 7 S R. 2 E and continue to the point where the Middle Route rejoins the proposed route (Figure 8-28). The environment would be as described for the Middle Route overhead line.

Environmental impacts resulting from burying this segment of

line would include removal of 15 homes and the foreclosure of opportunity to develop 65 lots. Based on a value of \$50,000 each (\$42,000 homes, \$8,000 per lot), this would amount to a loss of present and future residential values of \$4 million. An estimated 42 persons would have to be relocated.

Impacts to human health and safety, and aesthetic values (due to an overhead line) would be eliminated by having this segment underground. Development of the proposed park north of Sunset Elementary School could proceed; although facilities and landscaping would have to be altered to comply with allowed usage of the right-of-way.

(c) Underground Airport Route

As discussed previously, the Airport Route overhead line was not considered a viable alternative because it created a hazard to air navigation around the Provo City airport. This route would be technically feasible if part of it were underground. The alignment of this route and the underground segment are shown on Figure 8-28.

The environment of this route and the impacts resulting from construction of the transmission line would be similar to those described for the Middle Route. It would not be necessary to remove any homes with this alternative, and since most of the route would be outside the low density residential zone, impacts on residential values would be minimal. Construction would temporarily interrupt agricultural activities on approximately 20 acres, but if the land were returned to productive use, no long-term impacts would occur. The terminal structures would permanently occupy approximately 2 acres of agricultural land.

J. OTHER ENERGY SOURCES

1. Oil and Gas

An oil- or gas-fired, steam-electric plant is almost identical in principle of operation to a coal-fired plant. The difference would be the type fuel used and the equipment required for storing and burning the fuel. An oil-fired plant would require storage tanks at the site. Neither oil- nor gas-fired plants would require electrostatic precipitators for removal of particulate emissions.

Although oil- or gas-fired plants are comparable in construction costs to coal-fired plants, there is a question of the future availability of the fuels. Present estimates of U.S. petroleum reserves that can presently be economically extracted are 50 billion barrels. At today's rate of consumption of about 18 million barrels per day, the reserve amounts to approximately an 8-year supply, assuming all oil used were to come from domestic sources. However, some estimates based on undiscovered reserves range between 88 billion and 810 billion barrels (University of Oklahoma, 1975). To produce the same amount of energy with oil rather than coal over the 35-year economic life of the plant would require 230 to 360 million barrels of oil (Littlejohn, 1976).

Natural gas is also in short supply. The rate of consumption in recent years has been greater than the rate of discovery. In 1973, proven reserves in the 48 contiguous states were 218.3 trillion cubic feet, and 250 trillion cubic feet including Alaska. At the present rate of consumption, the life of these reserves is estimated to be only about 10 years.

Presently the well-head price of natural gas is set by the

Federal Power Commission (FPC) rather than by market forces. It is thought that if the price were deregulated, as has been proposed, domestic production would be stimulated, but the price would likely be much higher than today's level (University of Oklahoma, 1975). To produce the same amount of energy over the 35-year economic life of the plant with natural gas rather than coal would require 1.3 to 2.0 trillion cubic feet (Littlejohn, 1976).

Because of the lower level of pollutant emissions, with the exception of oxides of nitrogen, oil- or gas-fired plants can generally be located closer to load centers than coal-fired plants. Also, since both oil and gas may be more economically transported than coal, siting of those plants is less fuel dependent. Because of the proximity to load, oil- and gas-fired plants require shorter transmission lines than most coal-fired plants.

The impact of an oil- or gas-fired plant would be less in terms of air pollution. Particulate and SO_2 emissions would be much less than for a coal-fired plant. However, NO_x emissions are dependent on the combustion temperature and not on the fuel type. Therefore, NO_x emissions could be a problem.

The land area required for an oil- or gas-fired plant is comparable to that for a coal-fired plant. About the same amount of cooling water is required for oil-, gas-, or coal-fired plants. If the oil- or gas-fired plant were built near a populated area, there would be less adverse impact upon plant and animal life than by a coal-fired plant built in a remote area, and there would be less need for power transmission lines. However, this impact may be partially offset

by the need for an oil or gas pipe line.

The principal unavoidable impact would be the sight of the plant near a populated area and the steam plume emanating from the cooling towers. Oil storage tanks would also create a safety hazard which would be unavoidable.

2. Nuclear

Nuclear plants use the same steam-cycle principle used in a fossil-fueled steam plant, the only difference being the source of heat is nuclear reaction instead of chemical combustion. Presently, there are three types of nuclear plants - light water, gas-cooled, and liquid metal fast-breeder plants.

The light water reactor uses the fission of uranium to heat water to provide steam to drive a turbine. The steam temperature is only about 600° F compared to 1000° F for a fossil-fueled steam plant. To produce the same amount of energy over the 35-year economic life of the plant, approximately 315 tons of a uranium oxide (U_3O_8, a product of the refinement of uranium which contains U^{235}) would be required in place of coal (Littlejohn, 1976).

The gas-cooled reactor also uses the fission of uranium to produce heat, but the heat is carried away from the reactor by helium instead of by water. In turn, the helium is sent through a heat exchanger to generate steam from water which then runs the turbine. This type of plant operates at a higher steam temperature (1,000° F) than the light water type. Therefore, the efficiency achieved is about 40 percent as opposed to 32 percent for the light water reactors.

The third type of nuclear plant is the liquid metal fast-

breeder reactor. Heat is produced by the fission of plutonium (Pu^{239}). The reactor is called fast breeder because the fission process results in more fissionable Pu^{239} than is consumed. Instead of water or gas as a coolant, a liquid metal such as sodium is used. Because of high operating temperatures, these plants can attain efficiencies up to 41 percent.

To date, only one commercial fast breeder reactor is being planned for construction in the United States. However, the AEC (now ERDA) has studied the fast breeder concept for more than 20 years. Presently, industry and the government are committed to building one of these types of plants on the Clinch River in Tennessee. The plant will go into service about 1987.

One other type of nuclear plant which is not presently in use, but holds promise for the future, is the fusion plant. In the fusion process (which is the reaction that takes place in the sun and in a hydrogen-bomb explosion) the nuclei of two heavy hydrogen atoms (duterium) are brought together, as opposed to the splitting of heavy elements in the fission process. Because of the very high heat of this reaction, any known material would vaporize if allowed to come into direct contact with it. Therefore some other means of containment, such as by a magnetic field, would be required. Although fusion is thought to have the potential for supplying all of mankind's energy needs for millions of years, commercial development will be a formidable task. The fusion plant is expected to take at least 25 years to develop.

A nuclear plant is not fuel dependent and consequently could be located anywhere with an adequate water supply if no other factors

were involved. However, there is presently much concern over the safety of nuclear plants which generally precludes their location less than 50 to 100 miles from major load centers. Nuclear plant location difficulties are similar to those of coal-fired power plants, but are aggravated by more stringent safety requirements and the need for larger volumes of condenser cooling water. In addition, the nuclear plant presents similar problems related to the cost and availability of fuel. It also has the problem of the disposal of spent nuclear material. The lead-time required to accomplish the design, licensing, and construction of a nuclear plant would range from 8 to 10 years. Conformance to AEC (now ERDA) siting regulations would mitigate impacts, but locating the plant in any area would result in unavoidable impacts.

3. Solar

Among the methods of harnessing the plentiful solar energy reaching the earth's surface are direct-conversion photovoltaic cells, steam-cycle conversion plants, and direct thermal use.

Photovoltaic cells convert sunlight directly into electricity. The cells are used in camera light meters and in satellites and space stations. They are also used for triggering automatic yard and street lighting and for providing low power needs at remote locations. The cost of power generated by photovoltaic cells is extremely high, about $200,000 per kW, which is 300 to 400 times the present cost of power from fossil-fueled plants. Costs could be reduced through large-scale mass production (University of Oklahoma, 1975).

Steam-cycle conversion plants would transfer the heat from the sun to a working fluid, such as water, to generate steam to power a

conventional turbine. Large areas of reflectors to concentrate the sun's rays would be required. Additional research and development are needed to produce practical designs for commercial power generation.

Direct thermal conversion would use the sun's heat directly in building heating and cooling, without conversion to electricity. Experimental buildings have been built, but large-scale utilization of direct thermal conversion for building heating and cooling probably is one to two decades in the future.

Of the three methods, only steam-cycle conversion holds promise for commercial power generation. Based on a steam-cycle plant having an overall efficiency of about 12 percent, located in the salt desert area of northwest Utah with an average insolation rate of 1,400 to 1,600 Btu per square foot per day, a plant producing the same annual energy as an 860 MW base load steam plant would require slightly over 10 square miles of collectors.

The state of the art of solar power has not been developed to an extent that solar energy can be considered a viable alternative for the generation of 860 MW of power.

4. Hydroelectric

In hydroelectric power generation, water is stored in a reservoir and released through a turbine, driving a generator which produces electricity. Most reservoirs are located on flowing streams and depend on stream flow to refill them. Pumped storage reservoirs may be located in any convenient spot.

Substantial amounts of dependable water are required to generate electricity; one kilowatt is equivalent to 88.4 gallons of water falling

1 foot each second. An 800 MW hydroelectric plant (with 80 to 90 percent efficiency) would require 6.5 million acre-feet per year falling 1,000 feet. One such site exists within a reasonable distance, on the Colorado River between Glen Canyon and Hoover Dam. Previous efforts to construct a reservoir within this reach of the Colorado River have met with intense opposition. On the basis of average flow alone, the lower Green River might sustain a hydroelectric power plant of up to 400 MW, if a suitable site could be found. Any other sites in Utah would have smaller potentials.

A pumped-storage reservoir installation consists of a high-level reservoir, a low-level reservoir, and a generating/pumping station between. During high demand periods, water is released from the high-level reservoir and passes through the turbines, generating electricity in the conventional manner. During low-demand periods, such as at night, surplus power generated by other means is taken from the transmission system and used in the generators (now converted to motors) to turn the turbines (now converted to pumps) to pump water from the low-level reservoir back into the high-level reservoir. About 2 kW of electricity are recovered for every 3 kW used to pump water into the high-level reservoir. The use of a pumped-storage system is to provide peak generating capacity usually on a short-term basis. A pumped-storage system does not increase a utility system's sustainable capacity (indeed, it reduces it), but does provide extra peaking capacity when needed. A pumped-storage system would not substitute for a base-load plant such as the Emery plant. Hydroelectric power generation cannot therefore be considered a viable alternative to the Emery proposal.

5. Wind

Wind power is not a new concept. It has been used for centuries to propel ships, to pump water, and to mill grain. Small windmills are still used quite extensively for water pumping in the remote areas of the country, and prior to rural electrification wind generators provided small amounts of electric power on farms. However, wind has never been used on a large scale to generate electric power.

Wind power, like hydro and solar power, uses a renewable resource and is nonpolluting. It is also intermittent in nature like solar and hydro energy. Similar to solar power, wind is of low density, requiring huge installations to harness the available energy. Much experimentation is taking place on various rotor designs, but installation costs remain high- approximately $10,000 per kW. Larger installations and mass production of components could bring these costs down to more competitive levels in the future.

Wind-powered plants can theoretically be located anywhere the wind blows steady and fairly strong. Those areas are along the coastlines and in the Great Plains regions.

The impacts of wind generation would be principally the vast amounts of acreage required for large installations, and the effects on the aesthetics by the construction of a forest of high towers and rotors upon the landscape.

To produce the energy equivalent of an 800-MW steam plant, a wind power plant located in the Central States would consist of about 3,000 machines with 200-foot rotors. Due to the low load factor, the combined capacity required would be about 3,400 MW. With an estimated

density of 40 MW per square mile, such an installation would cover 85 square miles. Wind power has not been developed to an extent that it could be considered a viable alternative.

6. Geothermal

Geothermal plants employ steam or hot water from underground reservoirs to drive conventional steam turbines to generate electric power. Only one commercial geothermal electric plant is presently operating in the United States - at the Geysers in northern California.

Only in recent years has much geothermal drilling been done. Estimates of available geothermal energy vary widely. Some estimates indicate that about 1,000 to 1,200 MW can be generated from known recoverable reserves. Somewhat higher estimates range from 3,000 to 8,000 MW for the entire United States. For a more detailed discussion of geothermal energy, refer to the publication, Energy Alternatives: A Comparative Analysis, University of Oklahoma, 1975.

Most of the geothermal resources in the area are in the western part of Utah and in Nevada. The UP&L is engaged in a drilling program in several parts of western Utah, and it is likely that any future geothermal development would be in that area. Much exploration remains to be done, and a geothermal field in the area capable of sustaining an 860-MW power plant has not been proven.

The main impacts of using geothermal energy are visual intrusion, pollution, waste waters, and the problems of odor.

The visual impact results from the fact that about 75 percent of the waste steam from a geothermal plant would be evaporated creating a visible and continuous plume. Secondly, the steam is high in dissolved

solids which would pollute surface waters. Lastly, geothermal steam often contains hydrogen sulfide which would permeate the area with the odor of rotten eggs.

The problems of the visual impact and odor could be mitigated by having the plants located as far as possible from populated areas. The waste water problem could be mitigated by its reinjection into the ground. The visual impact of the spent steam would be unavoidable. Exploration of southwest Utah geothermal areas continues, but development of a geothermal power plant of any size is several years in the future.

7. Substitution of Energy Sources

The environmental impacts of each alternative energy source have been discussed previously as completely independent energy sources. Table 8-31 lists the energy equivalents which would be required of other energy sources to replace anticipated coal consumption during the 35-year economic life of the plant.

K. ENERGY CONSERVATION

There are presently no statutes requiring conservation of electrical energy for domestic or industrial use. There is legislation for transportation energy conservation placing a 55 mi/h maximum speed limit on all highways.

A number of possible energy conservation bills have been recommended, but to date no legislation has been finalized. Conservation of energy now depends on voluntary action on the part of consumers.

Electrical energy consumers may be divided into two major categories - domestic (household), and industrial.

TABLE 8-31

Energy Needed From Other Sources To Replace Anticipated Coal Consumption During the 35-Year Economic Life of the Plant

	Range Low — High
Coal Requirements	56 million to 84 million tons
Oil[a]	230 million to 360 million barrels
Natural Gas[b]	1.3 trillion to 2.0 trillion cubic feet
Coal Gasification[c]	77 million to 114 million tons
Coal Liquefaction[d]	90 million to 135 million tons
Oil Shale[e]	329 million to 514 million tons of shale
Nuclear Capacity[f] (830 MW Capacity) Enriched U_3O_8	315 metric tons

[a]Assuming one barrel of oil equals 5.6 million Btu.

[b]Assuming one cubic foot of natural gas equals 1,000 Btu.

[c]Assuming processing efficiencies of 74 percent.

[d]Assuming processing efficiencies of 62 percent.

[e]Assuming high grade shale recovery of 0.7 barrels per ton of oil shale.

[f]Assuming 30 metric tons enriched U_3O_8 first core fuels, and 10 metric tons enriched U_3O_8 annual reloads with plutonium recycle for a normalized 830 MW light water reactor.

Household energy consumption is composed of three major uses - space heating, air conditioning, and water heating. The Office of Emergency Preparedness (OEP) suggested the following procedures for voluntary and mandatory energy conservation (OEP, 1972).

Short-Term Measures (1972-1975). "Provide tax incentives and insured loans to encourage improved insulation in homes. Encourage use of more efficient appliances and adoption of good conservation practices. Saving 100 x 10^{12} Btu per year (1 percent)."

Mid-Term Measures (1976-1980). "Establish up-graded construction standards, tax incentives, and regulations to promote design and construction of energy-efficient dwelling, including the use of the 'total energy concept' for multi-family dwellings. Provide tax incentives, research and development funds, and regulations to promote energy-efficient appliances, central air conditioning, water heaters, and lighting. Saving 5,000 x 10^{12} Btu per year (14 percent)."

Long-Term Measures (beyond 1980). "Provide tax incentives and regulations to encourage demolition of old buildings and construction of new, energy-efficient buildings. Provide research and development funding to develop new energy sources (e.g., solar and wind power). Saving 15,000 x 10^{12} Btu per year (30 percent)."

Other conservation measures might be initiated by the individual home owner which could reduce household heating and cooling needs. Examples are turning off lights, drawing blinds and draperies in unoccupied rooms, installing shades and awnings, etc. The thermal performance of homes could be improved by fitting houses with storm windows and storm doors; caulking and weatherstripping windows and doors; insulating attics in existing houses; insulating walls and ceilings in new homes (University of Oklahoma, 1975).

As new houses are built, or as furnaces and air conditioners are replaced, individuals could buy more efficient units.

Water heating efficency could be improved by insulation, better hot water transportation piping, and perhaps, heat recovery after the water is used.

President Ford in one of his State of the Union Messages suggested several means to reduce energy consumption. He proposed legislation to make thermal efficiency standards mandatory on new building, and a tax credit for home owners who install insulation equipment. He proposed a low-income energy conservation program, and to initiate various taxes and import duties.

Industrial energy consumption is most intensively used by six industries: Primary metals, stone, clay and glass products; petroleum and coal products; chemical products; and paper products.

The OEP suggested the following time sequence for energy conservation measures by industry.

Short-Term Measures (1972-1975). "Increase energy prices to encourage improvement of processes and replacement of inefficient equipment. Provide tax incentives to encourage recycling and reusing of component materials. Saving 1,900 to 3,500 x 10^{12} Btu per year (6 to 11 percent)."

Mid-Term Measures (1976-1980). "Establish energy use tax to provide incentive to upgrade processes and replace inefficient equipment. Promote research for more efficient technologies. Provide tax incentives to encourage recycling and reusing component materials. Saving 4,500 to 6,400 x 10^{12} Btu per year (12 to 17 percent)."

Long-Term Measures (beyond 1980). "Establish energy use tax to provide incentive for upgrading processes and replacing inefficient equipment. Promote research in efficient technologies. Provide tax incentives to encourage recycling and reusing component materials. Saving 9,000 to 12,000 x 10^{12} Btu per year (15 to 20 percent)."

Other measures which may be used to conserve industrial energy are energy conservation heat recuperation, heat recycling, and reuse (University of Oklahoma, 1975).

To date, success of the drive toward household and industrial conservation is random and individualized. There is no indication that these measures would be implemented in UP&L's market area to such a degree that further power development would not be needed.

L. DELAY

In the 1970 to 1974 period the growth rate in UP&L's summer peak loads averaged 7.9 percent per year. In the 1975 through 1980 period, the Company estimated that summer peak loads would increase by 10.4 percent. The latter figure includes a sale to Sierra-Pacific Power Company. Without that sale, the growth is estimated to be 9.1 percent per annum. Comparable growth rates apply in the winter, but annual peak demand is expected to occur during the summer for 1975 to 1980 as it did in the previous 5-year period. The estimated UP&L loads, generation, and reserve margins are shown in Appendix III. Following is a tabulation of the latest information available (as presented in hearings on May 27, 1975 to the Utah Public Service Commission) showing the expected summer loads and generation reserves which may result from a 1-year delay of Emery:

	1978	1979	1980
Estimated Firm Peak Load	2,166	2,365	2,528
Estimated Resources (own)	2,168	2,568	2,568
Imports or Exports	(90)	90	(110)
Total Resources	2,078	2,658	2,458
Reserve Margin (MW)	-0-	293	-0-
Percent of Firm Peak Load (reserve margin)	-0-	12.4	-0-

Below is this same tabulation without exports.

	1978	1979	1980
Estimated Firm Peak Load	2,166	2,365	2,528
Estimated Resources (own)	2,168	2,568	2,568

Tabulation continued:

Imports	180	220	0
Total Resources	2,348	2,788	2,568
Reserve Margin (MW)	182	423	40
Percent of Firm Peak Load (reserve margin)	8.4	17.9	1.6

Imports and exports are quantities of power which are bought from and sold to adjoining utilities.

During the 1975 to 1980 period the national growth of electrical demand is expected to be 6 percent. Assuming that rate of growth for UP&L loads, and 1-year delay of Emery, the following tabulation results:

	1978	1979	1980
Estimated Firm Peak Load	1,834	1,944	2,061
Estimated Resources (own)	2,168	2,568	2,568
Imports or Exports	(90)	90	110
Total Resources	2,078	2,658	2,678
Estimated Reserves Margin (MW)	244	714	617
Percent of Firm Peak Load (reserve margin)	13.3	36.7	29.9

System reserve is that amount of spare generating capability which can be put into service during a contingency such as normal maintenance shutdowns, the loss of a line from a generating source, or the loss of a generating unit. This is not a fixed amount but varies from one utility to another. Traditionally, a figure of about 20 percent has been used. Presently, three methods of calculating required reserve margins are in general use.

A percentage of firm peak load which may be anywhere between 15 and 30 percent.

A percentage of firm peak load (perhaps 5 percent) plus the largest single hazard, be it the loss of a single transmission line or generating unit.

A figure determined by probability methods based on the chance of an outage of a particular magnitude from historical records.

The latter two methods are system dependent, calculated figures, as opposed to the first which is more or less a judgment.

In recent years the probability method has been adopted by many utilities and reserves. Requirements are reduced by pooling arrangements between interconnected systems due to a sharing of risks. The UP&L is a member of such a pooling group composed of several interconnected systems. Assuming the growth rate that UP&L estimates, the summer reserves can be brought to a level equal to those with Emery on schedule by both cancellation of exports and an increase in imports above those planned. The following tabulation is based on those assumptions.

	1978	1979	1980
Estimated Firm Peak Load	2,166	2,365	2,528
Estimated Resources (Own)	2,168	2,568	2,568
Imports Planned	180	220	0
Additional Import Required	130	(130)	290
Total Resources	2,478	2,658	2,858
Reserve Margin (MW)	312	293	330
Percent of Firm Peak Load (reserve margin)	14.4	12.4	13.1

Peak-load pricing or load management could be used to redistribute

or change energy consumption patterns. Peak load pricing requires that energy use by individual consumers be metered by quantity and time. During times of peak demand the consumer would be charged a premium rate, but during times of low demand the consumer would be charged a markedly lower rate. Peak-load pricing has been field tested in Europe and in the state of Vermont. The European tests may not apply to American energy markets, but the Vermont data should be an indicator. The Vermont experience indicated that price incentives would shift peak electricity use from mid-morning to late evening.

Studies on peak-load pricing indicates that a delay of needed construction for additional power needs would be less than 1 year. Each consumer would have to receive a new meter. The cost of the meter and installation is about $600 per hook-up. In order for peak-load pricing to be effective, punitive charges would have to be assessed, or consumers would merely bear the burden. If punitive prices for power during peak-load were imposed, only persons with high incomes could afford the luxury of air conditioning and other amenities produced by daytime electrical power.

A study being made by UP&L shows other methods of conservation to be more realistic at present. These include strict rotational scheduling of irrigation pumps and change in times of peak industrial demand. An example would be irrigating at night or working more swing and graveyard shifts.

Even with the most optimistic projections, a delay of less than one year in additional generation needs would be realized.

A delay in the Emery operation would mean that electricity would have to be purchased from other companies. In all probability

UP&L would also accelerate the construction of Units 4 and 5 at Naughton.

These units are scheduled to go into service in 1982 and 1984. By accelerating construction, these units could be brought on line 1 or 2 years earlier to partially replace the power which would have been supplied by Emery. An environmental analysis is currently being prepared by the BLM in Wyoming to disclose impacts from the construction and operation of Units 4 and 5 at Naughton, near Kemmerer, Wyoming.

An accelerated construction program at Naughton would mean an increase over the presently planned number of workers. The number of additional workers is not known, but they would add socioeconomic impacts of an undetermined magnitude to the town of Kemmerer.

M. NO ACTION

The effects of no action would be similar to those discussed under delay. Reserve margins would be reduced or eliminated, and to compensate, the Company's scheduled exports and imports would need to be changed. No action would extend until such time as some alternative generator could be brought on the line. It could create more serious consequences for consumers than a 1- or 2-year delay.

In all probability the no action alternative would mean that an accelerated construction program would occur at Naughton on Units 4 and 5. These units are planned to be in service in 1982 and 1984. Accelerated construction would take place in order to more rapidly replace the power lost by not constructing Emery. Such a construction program would mean that more workers would be required creating greater socioeconomic impacts on the town of Kemmerer. There are insufficient data to determine the exact numbers of additional employees required and

associated impacts.

If the Emery power plant is abandoned, those residents left in the county would continue to be responsible for retiring $4,277,000 in indebtedness for committed bonds, loans, and other financial obligations. Growth in the Carbon-Emery County area would continue regardless of the Emery project. The Emery power plant and Wilberg Mine represents about 12 percent of the projected growth in the area. (See Chapter 3, section P for further discussion.)

If the no action alternative were chosen, water that would have been required for the plant could continue to be used to irrigate crop lands. In addition, the water could be used for alternative energy sources, such as coal gasification or oil shale development. However, no plans for these alternative uses are currently known, therefore impacts unknown.

In the same respect, if the coal was not mined it could be used by other generating units, for coal gasification, petro-chemicals, or be held in reserve for some future use. If the coal was held in reserve, there would be no change in the existing environment. No known plans exist for other specific alternatives, therefore impacts are unknown under no action.

All unavoidable impacts described in Chapter 5 would be eliminated by use of the no action alternative.

CHAPTER 9

CONSULTATION AND COORDINATION

9

CHAPTER 9

CONSULTATION AND COORDINATION

A. INTRODUCTION

This chapter discusses the consultation and coordination conducted in preparation of the environmental statement (ES). Items discussed include: a brief synopsis of the development of the statement; organization of the interagency team; federal, state, local, and public contacts; adherence to mandatory federal law; and significant meetings held. Organizations that received a copy of the draft statement and were requested to submit written comments to improve the adequacy of the final statement are also listed.

The chapter also contains a chronological history of the public review period, a description of how the public comments were reviewed and accommodated, a brief analysis of general comments, a section on hearings testimony and Bureau of Land Management (BLM) responses, and a section on written comments and BLM responses.

Copies of the letters that presented significant contributions to the adequacy of the statement are reproduced. A listing of these letters is found at the beginning of Section K this Chapter.

B. CONSULTATION AND COORDINATION

On April 12, 1974, a meeting was held involving Utah Power and Light (UP&L) officials and representatives of the State of Utah, the U.S. Forest Service, the BLM, the U.S. Bureau of Reclamation (USBR), and the U.S. Geological Survey (USGS). During the meeting, UP&L officials requested the BLM to prepare an ES for the Emery power plant. By memorandum dated April 26, 1974, the Utah State Director, BLM, requested permission from

the Director, BLM, to prepare an ES for the proposed Emery project. The Director, BLM, instructed the Utah State Office to take lead responsibility for the preparation of the statement with instruction to issue a contract for the preparation of an environmental assessment of the project.

Effective September 27, 1974, the BLM contracted with Voorheis, Trindle, and Nelson (VTN) to prepare an environmental assessment (baseline data study). Soon thereafter, by memorandum October 3, 1974, the Utah State Director delegated the responsibility for preparing the Emery ES to the BLM Price District, Price, Utah. The BLM received the completed VTN study in February 1975.

Subsequently, the Utah State Director, by memoranda dated March 26, 1975, requested formal assistance from the U.S. Forest Service and the USGS. Similar memoranda, dated March 31, 1975, were also forwarded to the National Park Service and USBR.

Utah Power and Light officials met with BLM representatives on April 21, 1975, to discuss project proposal information. After review of the information, BLM requested additional project material information from UP&L (memorandum April 23, 1975). On August 11, 1975, representatives from BLM, USGS, U.S. Forest Service, Peabody Coal, and UP&L met to clarify what additional information was needed regarding the mining plan.

C. UNRESOLVED ISSUES

1. Flue Gas Desulfurization

The applicants current proposal is to construct the power plant without the use of Flue Gas Desulfurization (FGD). On March 10, 1976, the

Environmental Protection Agency (EPA) sent a letter to UP&L stating that the proposal to not use scrubbers constituted a modification and would place the plant under the Prevention of Significant Deterioration Regulations (PSDR), inasmuch as the original proposal was for 80 percent sulfur dioxide removal. The UP&L has petitioned for review, in the United States Circuit Court of Appeals, EPAs determination (see Chapter 8, Section C, Alternative Plant Design and Operating Methods).

2. Provo Transmission Line Segment

A number of local residents of Provo are opposed to the Company proposed I-15 transmission line route through Provo. Utah Power and Light Company has already started to obtain property for the route. A group of local residents have filed a complaint in the Fourth District Court of Utah against UP&L. Trial on this is pending.

D. ORGANIZATION OF THE INTERAGENCY TEAM

The interagency team organized to prepare the ES included staff personnel from the BLM, the USGS, the USBR, and the U.S. Forest Service. In March 1975, the interdisciplinary ES team was organized under the leadership of a team leader in the BLM Price District Office. However, under the BLM reorganization in Utah, the Price District was eliminated and as a result, the ES team was moved to Richfield, Utah, in August 1975.

The team personnel represented broad categories of environmental expertise, including air quality, soils and vegetation, wildlife, socio-economics, hydrology and water resources, geology and mining, land uses, and scenic and recreational resources. Members utilized an interdisciplinary team approach in their analyses and writing activities during

preparation of the statement. The team totaled 19 persons.

E. INTERAGENCY AND PUBLIC CONTACT ACTIVITIES

1. Federal Contacts

The following list reflects the number and extent of federal contacts initiated and actions completed in preparation of the draft statement. The comments received from the federal agency contacts were considered in preparation of the statement.

Agency	Nature of Contact	Response Received	Action Taken
U.S. Forest Service	Request staff and data assistance; compliance with Sikes Act	Yes	Provided one staff member and data assistance
U.S. Geological Survey	Request staff and data assistance	Yes	Provided one staff member and data assistance
National Park Service	Request staff assistance, statement of interest, and data assistance	Yes	Unable to provide staff member; provided assistance and guidance
Federal Energy Administration	Request statement of interest and data assistance	Yes	Provided full assistance as requested
Federal Power Commission	Request statement of interest and data assistance	Yes	Jurisdictional concerns were satisfied; comments provided
Bureau of Reclamation	Request staff and data assistance	Yes	Provided one staff member and data assistance
U.S. Corps of Engineers	Request statement of interest under Section 404, Federal Water Pollution Control Act; Rivers and Harbors Act of 1899 (Sec. 10)	Yes	Jurisdictional concerns were satisfied

Soil Conservation Service	Requested data assistance	Yes	Assistance provided
Advisory Council on Historic Preservation	In compliance with the National Historic Preservation Act	Yes	National Register of Historic Places was consulted; no known properties are involved
Occupational Safety and Health Administration	Request statement of interest	Yes	No jurisdictional concern
Federal Aviation Administration	Discussed permits and power plant lighting	Yes	Concerns were satisfied
Mining Enforcement and Safety Administration	Discussed mining safety	Yes	Concerns were satisfied
Environmental Protection Agency	In compliance with Clean Air Act (Sec. 309) and Water Pollution Control Act (P.L. 92-500); request statement of interest, data assistance, and discuss permits	Yes	Concerns were satisfied and data assistance provided
U.S. Fish and Wildlife Service	In compliance with the Fish and Wildlife Coordination Act, Endangered Species Act, Migratory Bird Treaty Act, Sikes Act, Bald Eagle Protection Act, request data assistance	Yes	Provided data assistance; no jurisdictional problems
Regional Solicitor	Discuss legal matters	Yes	Provided legal assistance
Bureau of Outdoor Recreation	To discuss recreational sections of the statement, in compliance with the Land and Water Conservation Fund Act (Section 6), Wild and Scenic Rivers Act, the National Trails System Act, and Department of Transportation Sec. 4 (f) 1	Yes	Data assistance provided

Office of Economic Opportunity	Request data assistance	Yes	Provided data assistance

2. State Contacts

The Emery ES team established an effective working relationship with state agencies in Utah. Dr. Melvin T. Smith, Utah State Historic Preservation Office, was contacted to coordinate compliance with the National Historic Preservation Act, and his comments were considered in preparation of the statement. Many agencies of the Utah State Government having jurisdictional interests in the project were contacted and have supplied statement data. A complete list follows:

Office of the Governor

Office of the State Planning Coordinator

Department of Development Services

  Division of State History

Department of Natural Resources

  Division of Parks and Recreation

  Division of State Lands

  Division of Water Resources

  Division of Water Rights

  Division of Wildlife Resources

  Outdoor Recreation Agency

Department of Social Services

  Division of Health

    Branch of Environmental Health

    Water Quality Section

Department of Transportation

Public Service Commission

State Board of Education

State Highway Patrol

University of Utah

Utah Geological and Mineralogical Survey

Utah State Employment Security

Utah State Tax Commission

Utah State University

3. Local Contacts

Many public officials at the local level were advised of the project. Their views and comments were considered in preparation of the statement.

The following were consulted:

Board of Commissioners, Carbon County

Board of Commissioners, Emery County

Carbon County School District

Emery County Assessor

Emery County Planner

Emery County Zoning Administrator

Emery County School District

Mayor of Emery, Utah

Mayor of Huntington, Utah

Mayor of Price, Utah

Price City Planner

Provo City Planning Staff

Six-County Commissioners Organization

Southeastern Association of Governments

Utah County Planning Staff

Water Master of Peterson Ditch, Ferron, Utah

4. Public Contacts

Utah Power and Light officials conducted meetings on May 22, 1974, in Castle Dale, Utah, and on May 23, 1974, in Salt Lake City, Utah, to inform the public of the project.

The ES team met with the East Carbon Wildlife Federation on February 7, 1976. The Mineralogical Society of Utah, Utah League of Women Voters, Sierra Club, Issue, Utah Environment Center, Utah Audubon Society, Natural Resources Defense Council, Wilderness Society, Friends of the Earth, Utah Mining Association, Utah Gem Society, National Parks and Recreation Association, Price River Water Conservation District, and San Rafael River Water Conservation District were also contacted concerning preparation of the statement.

F. COORDINATION IN REVIEW OF THE DRAFT STATEMENT

The following list represents government and nongovernment organizations that received a copy of the draft statement and were requested to submit written comments.

Federal

Advisory Council on Historic Preservation*

Department of Agriculture

Forest Service*

Soil Conservation Service*

Department of Commerce

Soil Conservation Service*

Department of Commerce

National Oceanic and Atmospheric Administration

Department of Defense

Department of Health, Education and Welfare*

Department of Housing and Urban Development*

Department of the Interior

Bonneville Power Administration*

Bureau of Indian Affairs

Bureau of Mines*

Bureau of Outdoor Recreation*

Bureau of Reclamation

Fish and Wildlife Service*

Geological Survey*

Mining Enforcement and Safety Administration

National Park Service*

Office of the Solicitor*

Power Marketing Administration

Department of Labor

Occupational Safety and Health Administration

Department of Transportation*

Federal Aviation Administration*

Federal Highway Administration

Energy Research and Development Administration

Environmental Protection Agency*

Federal Energy Administration*

Federal Power Commission

National Oceanic and Atmospheric Administration

Department of Defense

Department of Health, Education and Welfare*

Department of Housing and Urban Development*

Department of the Interior

Bonneville Power Administration*

Bureau of Indian Affairs

Bureau of Mines*

Bureau of Outdoor Recreation*

Bureau of Reclamation

Fish and Wildlife Service*

Geological Survey*

Mining Enforcement and Safety Administration

National Park Service*

Office of the Solicitor*

Power Marketing Administration

Department of Labor

Occupational Safety and Health Administration

Department of Transportation*

Federal Aviation Administration*

Federal Highway Administration

Energy Research and Development Administration

Environmental Protection Agency*

Federal Energy Administration*

Federal Power Commission

Interstate Commerce Commission

State

State of Utah

Bureau of Environmental Health*

Department of Transportation*

Division of Lands

Division of Wildlife Resources*

Governor's Clearing House*

State Archaeologist

State Planning Coordinator*

Upper Colorado River Basin Commission

Utah Division Wildlife Resource

Local

Board of County Commissioners
Carbon, Emery, Garfield, Salt Lake, Sanpete,
Sevier, Utah, and Weber

Mayors of Castle Dale, Emery, Escalante, Ferron, Helper,
Huntington, Orangeville, Ogden, Price, Provo, and Richfield

Six County Commissioners Organization

Southeastern Association of Governments

Nongovernmental Organizations

Archaeological Society of Utah

Boulder Mountain Packers

Canyon County Coalition

Chamber of Commerce (Carbon County)

Chamber of Commerce (Salt Lake Area)

Common Cause

Conservancy Resource Center

Common Cause

Conservancy Resource Center

Council of Utah Resources

Defenders of the Outdoor Heritage

Defenders of Wildlife

Desert Protective Council

Enchanted Wilderness Association

Environmental Awareness

Environmental Defense Fund, Rocky Mountain/Great Plains*

Escalante Wilderness Committee

Friends of the Earth*

Good Earth

Institute of Ecology

Isaac Walton League - Utah Division

ISSUE

League of Women Voters

Mearns Wildlife Society

Mineralogical Society of Utah

National Parks and Recreation Association

National Resources Defense Council, Inc.

National Wildlife Federation

Nature Conservancy

Pro-Utah, Inc.

Rocky Mountain Center on Environment

Rocky Mountain Federation of Mineralogical Societies

Rocky Mountain Sportsmen Association

Save Our Canyons Committee

Council of Utah Resources

Defenders of the Outdoor Heritage

Defenders of Wildlife

Desert Protective Council

Enchanted Wilderness Association

Environmental Awareness

Environmental Defense Fund, Rocky Mountain/Great Plains*

Escalante Wilderness Committee

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National Wildlife Federation

Nature Conservancy

Pro-Utah, Inc.

Rocky Mountain Center on Environment

Rocky Mountain Federation of Mineralogical Societies

Rocky Mountain Sportsmen Association

Save Our Canyons Committee

Sierra Club*

Society of Conservation of Bighorn Sheep

Utah Audubon Society

Utah Cattlemen's Association

Utah CLEAR

Utah Environment Center*

Utah Farm Bureau

Utah Geological and Mineral Survey

Utah Lung Association

Utah Mining Association

Utah Nature Study Society

Utah Sportsmen Association

Utah Water Users Association

Utah Wildlife and Outdoor Recreation Federation

Utah Wool Growers Association

Wasatch Mountain Club

Western Rockhound Association

Wilderness Society of America

Women's Conservation Council of Utah

Private Companies, Universities

American Coal Company*

Brigham Young University*

Intermountain Consumers Power Association*

Peabody Coal Company*

Utah Power & Light Company*

Utah State University*

*Comments on draft received.

G. PUBLIC HEARINGS

The schedule for formal public hearings was published in the Federal Register on August 6, 1976. A news release announcing the formal public hearings was issued on August 30, 1976. The release was sent to newspapers in Carbon and Emery counties and to newspapers in those communities along the entire proposed transmission route. The meetings were held in Castle Dale, Utah, on September 8 and in Provo, Utah, on September 9, 1976.

Mr. Harvey Sweitzer presided as administrative law judge at each session with the following as panel members:

Paul L. Howard	State Director, Utah, Bureau of Land Management.
Carl Thurgood	Team Leader, Environmental Statement Proposed Emery Power Plant.
Roy Edmonds	Socioeconomist, Bureau of Land Management
Dee Williamson	Biologist, Bureau of Land Management
James Littlejohn	Air Quality Specialist, Bureau of Land Management

One hundred seventeen persons attended the hearing in Castle Dale; 16 presented testimony. At Provo, 79 persons were in attendance and 13 testified.

H. REVIEW PERIOD FOR WRITTEN COMMENTS

The Draft ES was issued August 6, 1976. The Notice of Availability was published in the August 6, 1976, issue of the Federal Register. The notice also announced a 45-day public review and comment period, ending September 20, 1976.

In addition to the Federal Register notice, a news release was

issued on August 30, 1976, by the BLM Utah State Office to six newspapers, two radio station and three television stations.

After publication of the Notice of Availability, copies of the Draft ES were mailed to federal, state, and local government agencies and to nongovernment organizations for their review and comment. Approximately 500 copies of the statement were distributed. Eight public and university libraries were provided copies. In addition, official reading copies were made available to the public at the following locations:

Bureau of Land Management
Utah State Office
University Club Building
136 East South Temple
Salt Lake City, Utah 84111

Bureau of Land Management
Richfield District Office
850 North Main Street
Richfield, Utah 84701

Bureau of Land Management
Price Area Office
900 North 700 East
Price, Utah 84501

College of Eastern Utah - Library
451 East 400 North
Price, Utah 84501

Emery County Library
Castle Dale, Utah 84513

Harold B. Lee Library
Brigham Young University
Provo, Utah 84602

I. REVIEW PROCEDURE FOR PUBLIC COMMENTS

Only those comments that addressed the adequacy of the Draft ES were selected for response. Comments presenting new information, questioning data or analyses, or raising questions and issues bearing directly upon the Draft ES were fully considered and evaluated. All comments, as received in the hearings and in letters, were reviewed to determine whether they met the above criteria for consideration for inclusion in the Final ES.

Many comments were similar in substance. Consequently, in the

sections that follow, the reader is referred to the initial response in answer to all similar comments. The complete letters from governmental agencies, private organizations, and "recognized experts" are reproduced in the order in which they were received. Other comment letters were considered and responded to, but were not reproduced in this document.

Many letters which did not meet the criteria but merely indicated a preference for or against the project were evaluated for "attitudinal" purposes only and were not included in the Final ES.

The hearing transcripts and all written comments are available for public review at the BLM, Richfield District Office, 850 North Main Street, Richfield, Utah 84701.

J. GENERAL COMMENTS

All comments received were reviewed. Specific comments are discussed in either the hearings section or written comments section which follow. General comments are discussed here.

1. General Comment No. 1

An adequate environmental statement cannot be written inasmuch as the UP&L Company is currently building the generating complex.

Response: It was of considerable concern to BLM that UP&L continued to construct the plant while the ES was being written (see letter Appendix I-5). The UP&L reply (see letter, Appendix I-6) indicated that the company was aware of the possibility of disapproval of those Federal actions required for rights-of-way for transmission lines and for water and coal facilities on Federal lands which were necessary for the operation of the plant. However, the company further indicated that even if the Emery site was considered unsatisfactory the alternatives were still viable. A further consideration was that the UP&L is constructing a plant on private land over which the Federal government has no jurisdiction, BLM recognized these circumstances and therefore concluded that all alternatives should be fully evaluated notwithstanding the fact that power plant construction was underway.

2. General Comment No. 2

Utah Power and Light Company changed the routing of the proposed transmission line west of Provo, and that the new routing had not been assessed in the Draft ES.

Response: The BLM received notification from UP&L on September 3, 1976, more than 30 days after the Draft ES was published, that a new route for the transmission line (different than the proposal in the Draft ES) was being considered through the Provo area. Problems concerning the original routing of the line near the airport appeared to be overriding, and the Company was making arrangements for procuring land near Interstate 15 for the transmission line.

The actual situation became clear at the hearing conducted in Provo. The UP&L had changed the proposal and as a result an interdisciplinary team was organized by BLM to evaluate the situation. The results of the evaluation, as well as alternatives to the new proposal, are discussed in Chapter 8.

K. HEARING COMMENTS AND RESPONSES

1. Individuals Who Presented Statements

Speaker	Representing	Location of Hearing
Gardell Snow	Emery County	Castle Dale, Utah
Paul Humphrey	Orangeville City	Castle Dale, Utah
William K. Dinehart	Southeast Utah Economic District	Castle Dale, Utah
Douglas Gore	Southeast Utah Economic District	Castle Dale, Utah
Jack L. Beckner	Peabody Coal Company	Castle Dale, Utah
Doyle Barney	Castle Dale Town	Castle Dale, Utah
Owen McClenahan	Self	Castle Dale, Utah
D. W. Davis	Self	Castle Dale, Utah
Wayne Jensen	United Mine Workers of America Local 2176	Castle Dale, Utah
Carl F. Labbee	Self	Castle Dale, Utah
Lyle Reynolds	Self	Castle Dale, Utah
John M. Gard	Utah State Legislature	Castle Dale, Utah
Shirl McArthur	American Coal Company	Castle Dale, Utah
Fay Conner	Self	Castle Dale, Utah
Dr. Robert Makey	Self	Castle Dale, Utah
David Gordon	Self	Castle Dale, Utah
Neal A. Pay	Self	Provo, Utah
Ila Pay	Self	Provo, Utah
Shirley Taras	Self	Provo, Utah
Sandra Hardman	Self	Provo, Utah
Max Russell	Self	Provo, Utah
Douglas C. Fackrell	Self	Provo, Utah
Martin J. Wistisen	Self	Provo, Utah

Speaker	Representing	Location of Hearing
Jack L. Beckner	Peabody Coal Company	Provo, Utah
Mrs. Fred Aanerud	Self	Provo, Utah
Clay E. Crawford	Self	Provo, Utah
Nina Dougherty	Sierra Club - Utah Chapter	Provo, Utah
Robert Milberg	Self	Provo, Utah
David Cobb	Self	Provo, Utah
Lillian Hayes	Self	Provo, Utah

Comments by individuals who spoke at each hearing and the response to the comments are presented in order of the appearance of the speaker. The speaker's name is listed first and then the location of hearing. Comments ambiguous in nature or for which no specific reply was deemed necessary are not addressed herein.

2. Responses to Hearing Comments

a. Gardell Snow - Castle Dale, Utah

(1) Comment: Herein lies the crux of our problem. If the building of the Emery plant is stopped or delayed, who is going to pay for these new schools and additions? Who is going to pay for the expansion of sewage and water systems? Who is going to pay for our medical facility? For our detention center? Who is going to pay for homes and businesses? Where will the jobs be found to replace those that are lost?

Some might argue that if these plants were not here these problems of who is responsible and who will pay the bills and furnish the jobs and the businesses would not exist. They probably are at least partially right. But, the plants are here, and we have made preparations in anticipation of the creation of these and future power generating units. To now remove, stop, or slow down the building of these units would be to create economic havoc in our county, in our towns, and for our people. If we had done nothing, this would not be the case, but we have done something, as little as it might seem to some people, and to now slow down or stop our anticipated tax base by slowing or stopping the building of the aforementioned power units would be disasterous.

Response: If construction of the Emery Unit were stopped, the residents of the county would be required to pay for the community improvements since the county is responsible for the bonds. If jobs were lost as result of the stoppage they would probably not be replaced. A discussion of impacts should the Emery power plant be abandoned is discussed in Chapter 8 in the No Action Alternative section.

If plant construction were stopped or closed in Emery County, there would be an economic loss. This is the risk that the local

government and UP&L are taking by rushing into a project without a full disclosure and assessment of impacts. If the spirit of the National Environmental Policy Act was followed, these types of impacts could be avoided (see section on Restoring the Site to Original Conditions in Chapter 3 for further discussion on this subject). However, the Carbon-Emery area is now undergoing a growth period and, regardless of the Emery power plant, sufficient people would move into Carbon and Emery counties to pay for the needed services. As indicated in Chapter 3, it is estimated that persons working at the Emery plant and Wilberg Mine would represent only about 12 percent of the total anticipated population increase in Emery County.

(2) Comment: Let me cite a case in point. Due to the lengthy and seemingly unreasonable delays in the preparation of the requested EPA study or BLM study for an overland conveyor system from the Wilberg Mine to the Emery Plant site, the conveyor system appears at present to be abandoned. What this probably means to our county, to our towns, to our people, and to people everywhere, for that matter, is that every 8 minutes, 16 hours a day, a loaded semitruck will leave the Wilberg Mine, travel down a public road, pass through the town of Orangeville and cross over newly graveled and paved fields, that previously bore crops, on its trip to the Emery plant. The estimated cost for such a trucking system, including the operation and maintenance of such a system, based on the life expectancy of about 35 years for the plant and using our inflated 1976 dollars, comes to over $102 million. Contrast this to an estimated cost of $26 million for an overland conveyor system for the same period - approximately $75 million difference.

Response: The UP&L proposal is to truck the coal to the Emery plant during operation. The discussion of this proposal is covered in Chapter 1 through 7. The construction of the conveyor belt is still a viable alternative and is discussed in Chapter 8, Section F, Coal Transportation Methods.

b. Paul Humphrey - Castle Dale, Utah

Comment: Now, as a city, we are definitely in favor of that belt line, that conveyor system. It is a must, as far as I'm concerned. I would hate to see them trucks go down through town and pass them little kids like it does through Huntington. Huntington is fortunate in that they haven't had any more accidents than what they have had.

As far as the pollution, and so forth, which the environmentalists should be concerned with, I think more pollution would come out of the trucks, the exhaust, and so forth, than what there would through a conveyor belt.

Response: The analysis of impacts from hauling the coal by truck is covered in Chapter 3 under Air Quality and Human Health and Safety. The truck haul road would go west of Orangeville. The nearest house would be about 0.3 mile away.

c. Jack L. Beckner - Provo, Utah

Comment: (Editorial) Mr. Beckner gave a long presentation which resulted in modification of the proposal for the mining plants for the Wilberg Mine. Major changes included: mining of two seams instead of one; constructing an elevated conveyor belt; sewage disposal system; changes in the coal storage facility; and changes in excess mine waste water disposal. Mr. Beckner's complete text is not given here because of its length.

Response: All changes have been considered, and Chapters 1 through 7 have been modified in the Soils, Vegetation, and Water Resource sections to reflect the changes.

d. Lyle Reyonds - Castle Dale, Utah

(1) Comment: In several places in the Impact Statement it mentions about reseeding the disturbed areas around the power plant and along the haul road and also along the conveyor belt, if these are built. Based on the experience that we had and the amount of annual precipitation we have in the county and the soil type - the poor condition of the soil - I think that chances of success of reseeding these areas is practically zero. The experience we have had on the barren watershed is that we reseeded several areas, and also, incidentally, the BLM reseeded several thousand acres down there, and they have been almost a total failure. And so I think, that perhaps as the plans are made for rehabilitating these areas that are disturbed, perhaps the possibilities of reseeding should be further examined. I doubt very much that they would be successful, and I think that some other alternative would have to be considered. I am not saying that I am against digging them up or anything like that, but I think that reseeding would introduce species such that there would be no chance for success.

Response: Reseeding and the probability of success is discussed in Chapter 4 under Evaluation of Mitigating Measures. It is true that some areas cannot be reseeded, but these are mainly the blue gate-shale areas where very little grows to begin with.

(2) Comment: I did have one other thing that I picked up, and that mentions about the Rochester petroglyphs being 5 miles east of the power plant, and I believe the actual location of these petroglyphs is 5 miles east of the town of Emery, not the Emery power plant, so you might want to make that correction.

Response: The Rochester petroglyphs are located 2.5 miles east of the Town of Emery. This is shown in Chapter 2, Cultural Resources.

e. John M. Gard - Castle Dale, Utah

Comment: I do have some concern, frankly, about the negative attitude manifested on page 2 of the outline pertaining to the wording, and I am

sure you hear this quite frequently. "Stack emissions could also cause a reduction in visibility and could produce an evident yellow discoloration of the air."

I would like to point out - and you are certainly, of course, well aware of this - that by the same token it may not produce a resultant reduction in visibility and it may not produce a yellow discolaration of the air. I would encourage statements of that type to be both positive and negative rather than have a negative.

Response: Inasmuch as it is not known whether or not a yellow discoloration would occur, the word "could" has been used. In Chapter 3 in the Air Quality section under Nitrogen Dioxide a more complete discussion is given of the potential impact. It is stated that a yellow discoloration has not been observed at the Huntington power plant.

f. Fay Conner - Castle Dale, Utah

Comment: I am also an amateur archaeologist and I would like to ask you, if I may, if you felt that the quality of archaeological artifacts that we have here are any more important than the ones at Flaming Gorge Dam or Glen Canyon Dam.

Could I ask for your answer to that. I would also like to say that the petroglyphs are not at the Emery plant. They are at the town of Emery.

Response: The size and density of the Emery-related artifact sites would be much less, but the importance of the Emery sites may be critical. Since all human history is important and each culture is different, we have outlined stringent mitigating measures (see Chapter 4 Measures Required of the Applicant By Federal Agencies, No. 18 and No. 19). The reference to the pictographs has been corrected to indicate their true location.

g. Dr. Robert Makey - Castle Dale, Utah

Comment: I don't speak for Emery County Clinic. I am speaking from my own point of view. Also, in terms of the particulate discharge from the plant, which, as we all know, is not really important what comes out of the stack. It is the nonparticulate matter, such as the sulfur dioxide which can exacerbate asthma and emphysema. It has been shown to be a direct bronchial irritant and can cause bronchial constriction. Nitrous oxide and sulfur is not as dangerous, but I think these are truly the estimates of the worst grade of coal. I think that the community as a whole should be aware that these limitations are very liberal, in my mind and in the minds of people who are concerned with the health of the people throughout the nation, and I think the people of this town should understand that it is not what they see coming out of the stacks that is going to make them sick. It is what they don't see, and many people in this area will point to the plant in Huntington and say, "It is wonderful. There is no discharge. We don't see anything." I just want to remind them that it is not what they see. It is what they don't see that hurts them.

Response: Many pollutants are invisible, however, the National Ambient Air Quality Standards (NAAQS) are based on human health factors and not visibility. It is calculated that the proposed plant would easily meet these standards. This subject is discussed in the Air Quality section of Chapter 3.

h. Neal A. Pay - Provo, Utah

(1) Comment: On the original route it was plainly detrimental to the safety of the planes at the airport, according to the information we derived in the July 6 meeting. We were told by the City Commission that Utah Power and Light and the Pilot's Association had made that decision. We were also told that the middle route was also still close to the airport, even though several pilots at the July 7 meeting disputed that statement.

Response: The "original" route would violate FAA Regulation Part 77.23 (a)(3) because of its proximity to the airport. The "middle route" is discussed in detail under Alternative Transmission Lines in Chapter 8.

(2) Comment: Utah Power and Light said, "The company doesn't intend to file an Environmental Impact Statement." Why? I believe it is because they fear that the line will be rejected. I strongly urge that an environmental impact report be required for the I-15 alignment so that the foregoing problems may honestly be resolved and affect the least amount of people.

Response: An analysis of the proposed I-15 alignment can be found in sections of Chapters 2 through 7, Wildlife and Human Resources.

i. Ila Pay - Provo, Utah

(1) Comment: Yes. One of the references is "Power Over People" - and a lot of people - well, the power company disputes this and says they just can't believe that this could happen, but I mean why would he say that it is dangerous if it isn't? I mean, that is my opinion, and there is a letter here from Paula Ward, who is the North Dakota representative, and she is very interested in this, and she has put together a slide show, and it presents problems in four areas: visual pollution; electro-chemical pollution; noise pollution, plus audible and radio-TV interference; and an electric field hazard, and I think we should not have those things.

Response: Impacts, such as radio and television interference, noise pollution, and electrical field effects, were encountered in the 1950's when the first 345-kV lines were built. However, the power industry has learned to refine designs and procedures to hold these effects to reasonable levels. An analysis of the proposed I-15 routing (Provo transmission line segment) can be found in the section of Chapters 1 through 7 dealing with Human Resources.

(2) Comment: I am extremely concerned about the health and safety of the families who live along the route of the power line. It seems to me like 345,000 volts is an awful lot of power. I haven't read the book that was mentioned, but I have heard about it, and I have heard some of the report which is in this envelope, and it was sent to one of our neighbors, and I am sure that you have heard of it. It is a request for information concerning the detrimental effects of the Utah Power and Light line. I think it was a 6,000 page report or something, if I remember right, but I am really concerned when it says that this can be detrimental to our health in damaging genes and damaging chromosomes and the damages to the nervous system and such. I am really concerned. We have six children and they are all healthy, but if this is true, maybe I won't be having grandchildren, and if I do, what are they going to look like? This really concerns me.

Now, Utah Power and Light said that they do not believe that this will be detrimental to our health. I kind of feel that maybe this is a biased opinion. For example, in Salt Lake City there is a development of homes near a tailings pond. The company involved apparently assured the people that nothing would happen to them, and now these people are getting cancer.

Well, take cigarettes. The Surgeon General assured us that they are injurious to the health and yet maybe the cigarette companies don't completely agree with this.

If somebody can prove to me that this isn't injurious to our health, then that will really make me happy and put me at ease, which I certainly don't feel right now.

Response: A Russian study (1966) showed that extra high voltage power lines did have an effect on human health. However, a Swedish study (1973) reported no significant effect on the performance or well-being of a test group as compared to that of a control group. The findings of the Soviets have not been substantiated by reports from other sources. The effects remain speculative because of the difficulties of showing direct relationships in a complex environment. As yet, environmental investigations are inconclusive as to the possible existence and the significance of effects on organisms exposed to electrical fields under transmission lines.

j. Shirley Taras - Provo, Utah

(1) Comment: First of all, I certainly want to question the tactics used by Utah Power and Light when they chose to begin construction on this plant without fulfilling Federal regulations that an environmental impact study must be made before construction is begun. Could it be that in fact Utah Power and Light has forced a favorable study because it was known to the ones making the study that construction was under way? How can you justify spending the taxpayers' money to do an impact study to see if a power plant is feasible in a given area when the plant is already under construction? Has the fact that since huge sums of money have been spent on this project influenced the findings of this report?

Response: See response to General Comment No. 1.

(2) Comment: The other argument I have heard against the middle route was that this is the area of future expansion for Provo City. How can anyone justify protecting possible future homesites by tearing down homes already built and occupied in an extablished area?

It seems to me that Utah Power and Light has chosen for their transmission lines the route that would cause the very most visual impact by choosing Spanish Fork Canyon and along Interstate 15 through Provo. Their complete disregard for environmental impacts has been demonstrated time and time again since this project began.

Response: The proposed transmission route (I-15) is analyzed in Chapters 2 through 7. Chapter 8 deals with the "middle route" alternative, see Chapter 8, Section I, Transmission Lines.

(3) Comment: Why was so little study given to the waterfowl existing south of Provo in the Provo Bay area? I understand that power lines through this area will bring complete devastation to the waterfowl habitat, and that even two peregrine falcons, which are protected under the Endangered Species Act, have been sighted in this area.

Response: Peregrine falcons have been observed during the winter seasons. Consultation with the U.S. Fish and Wildlife Service and other wildlife authorities has indicated that construction of the power line would have little effect on waterfowl habitat or the peregrine falcons.

The impacts of the transmission line on waterfowl habitat and peregrine falcons are discussed in the Waterfowl, Shorebirds and Raptors Section of Wildlife, Chapter 3.

(4) Comment: Utah Power and Light has stated in public meetings that it is necessary for these transmission lines to come right through the heart of Provo because we need the power. Conversely, I have also heard that the Department of Interior plans to construct power plants in Spanish Fork Canyon that will supply the power needs of Provo and surrounding areas for years to come. Are we being made the scapegoats for cheap power for the northern part of the state? Do we have the right as private citizens to question and be considered, or is this hearing just another formality to be adhered to so that it can be said that it was done?

Response: As a result of the hearing, a thorough discussion of the proposed transmission line and alternatives through the Provo area is presented in Chapters 1-8, see Transmission Line, Section I, or the Discipline of Concern.

(5) Comment: I have been talking to Jan Johnson at the Utah Environmental Center, and she gave me the information about the fact that the peregrine falcons had been sighted there, and also my daughter spoke to a fellow who is a member of one of the groups. I can't remember his name, but he is here right now.

Response: The sightings of peregrine falcons in this area is discussed in Chapter 2 under Wildlife - Provo Transmission Line segment. Also see response to Comment No. 3 above.

k. Sandra Hardman - Provo, Utah

(1) Comment: A very hard hit area is Westbridge condominium development - and don't forget that these homes are priced at about $50,000, and that is certainly no small sum to pay for a home. The full first phase would encompass a clubhouse, day care center, basketball courts, sauna and pool, and about 30 homes. The second and third phases would include a total of 100 homes, a tennis court and many other options. To date, 15 units are completed and occupied. Every one of the original 30 were presold prior to construction, so do you wonder what happened to the others? About 12 of them had earnest money received, and building was scheduled several months ago. Many of these backed out when they found out about the proposed line, and the rest are holding further commitments until they find out what is going to happen with this line. Inquiries have literally become a thing of the past for prospective new buyers in that condominium. Now, if these people do indeed back out, the existing homeowners will not receive the above-mentioned incompleted amenities, nor will they be able to pay for what has already been put in.

On several occasions, we have been told that FHA financing has been held up on the Westbridge community development until a decision can be made on this power line. This means a costly holding pattern because building costs go up every day. It also means that if the line goes through, there will be an immediate and irreversible halt to the whole entire project there in these condominiums.

Response: An analysis of the impacts of the transmission line through the Provo City area is presented in Chapters 1 through 7, also see Chapter 8, Section I, Transmission Lines.

(2) Comment: I have heard emotional arguments about not choosing the middle route because of the airport. However, knowledgeable people involved in aviation say it would meet FAA requirements. Please let me ask you this. Have you heard of aircraft becoming lost in a storm and thinking a highway to be a landing strip, attempting a landing on that highway? Can you imagine the holocaust that would result if a plane hit one of these lines and crashed in a highly populated area? It very well could happen.

Response: The subject of alternative transmission line routes and their impacts is discussed in Chapter 8, Section I, Alternative Transmission Lines.

l. Clay E. Crawford - Provo, Utah

(1) Comment: The Emery Environmental Statement identified only 10 springs on the Wilberg lease. Those of us who intimately know East

Mountain know there are many additional springs. Consequently, further studies are needed. We are encouraged, however, that the USGS has been directed by administrative order to proceed with monitoring and identifying all water sources affected by coal mining in this area. No mining should occur until all surface water and all other natural resources are accurately inventoried. Such data are an absolute necessity in the decision-making process.

Response: There are 29 springs identified in Chapter 2 under Water Resources (see Figure 2-14).

(2) Comment: The Environmental Statement is somewhat contradictory with reference to private lands within the lease. One statement says that the surface in the Wilberg lease is unoccupied forest land while another states that a private landowner proposes a summer home development.

Response: The statement has been corrected to indicate that, of the lands above the Wilberg lease, 2,578 acres are Forest Service lands and 2,080 acres are private.

m. Nina Dougherty - Provo, Utah

(1) Comment: How many units are actually contemplated for the project? Are we talking about two units or four units? When are the next two planned for construction? It is important to know what is really projected for this complex and its ancillary needs. Are the presently planned transmission lines just the beginning of bigger ones to come in the same corridors? What kind of total air pollution are we talking about? What kind of water use? The project is described as being a two unit complex in the introduction of the statement. However, there are other references to the two additional units that would be at Huntington or Emery as well as a statement about the four units for both Huntington and Emery by 1990 (Page 8-161). At the November, 1975, Public Service Commission hearing for approval of the Emery units, Utah Power and Light attempted to obtain approval for all four Emery units.

Response: The project proposal is for two units. If additional units were planned for the future, UP&L would be required to apply to the Utah Public Service Commission for approval. Additional units would have to meet Environmental Protection Agency (EPA) air quality regulations, such as the New Source Performance Standards, National Ambient Air Quality Standards, and Prevention of Significant Deterioration Regulation. The EPA would require, as they have for construction of units 1 and 2, that UP&L install continouous in-stack monitors to continually measure pollutants being emitted to show compliance to standards. If standards are not met, EPA has the authority to take legal action. Additional units, if approved, would not necessarily need additional transmission lines. Much research is being conducted under contract with the Federal Government on high voltage transmission lines. The 345-kV lines could be replaced in the future with lines with a higher carrying capacity.

There are no firm proposals for additional units at Emery or

at Huntington. However, they are still alternatives for construction some time in the future. Because this was speculation, the section in Chapter 8 dealing with plans through 1990 has been eliminated.

(2) Comment: Coal. Where is all the coal for the first two Emery units to come from? We are left in suspense between the omissions and conflicting statements. We are told that the first two Emery units will need 84 million tons for the 35-year lifespan. We are also told that the intended coal supply contains only 70 million tons. But it seems that we aren't just 14 million tons short; more additional coal than that is needed because not all of the 70 million tons will be recovered. In one section of the report it is claimed that 70 percent of the 70 million will be recovered. In another section, it is stated that only 57 percent of that coal will be recovered (Page 3-63) - only enough for 17 years of the 35-year lifespan. Another section gives further information. We suggest that the information in the three sections be coordinated and that there is a clear description of where the remainder of the coal is coming from and what its composition is - also the mining and coal transporting system.

Response: The Draft statement points out that there are 70 million tons of recoverable coal in the Hiawatha seam. Therefore, there would be a deficiency of approximately 14 million tons. However, USGS is requiring that the Bear Canyon seam, directly above the Hiawatha seam, be mined first. This would provide more than enough coal for the 35-year life of the plant. The sulfur and ash content of the Bear Canyon seam is lower than the Hiawatha seam, which would result in cleaner plant emissions. The coal source section in Chapter I has been completely revised and includes a discussion of the Bear Canyon seam with this addition sufficient coal is available for the lifetime of the plant. Further contact with Peabody indicates that 50 percent of the coal would be recoverable.

(3) Comment: Air pollution control. In the main body of the statement we become aware that Utah Power and Light does not intend to control the SO_2 emissions from the two units. They state their legal position, which is left uncontested in this section of the report. EPA, however, does in fact contest Utah Power and Light's position - which fact the diligent reader may uncover in a letter in an appendix. We strongly suspect that the EIS cannot be considered unbiased as long as EPA's position is not presented in the main body of the report alongside Utah Power and Light's position.

Another instance of silent endorsement of Utah Power and Light's intention is the mitigating measures section of the Draft EIS where the statement is made that there are "no practical means by which to mitigate the addition of air pollutants, including SO_2 . . . to the minimally polluted atmosphere of the region." Utah Power and Light and the State of Utah may maintain that there are no practical means by which to lessen the SO_2 emission of 90 tons a day - but those concerned Utahns who are concerned do not expect you to abet them in their decisions. It is a sobering thought that the plant's SO_2 emissions wouldn't meet Class II standards which are designed to accommodate "air quality deterioration

normally accompanying moderate well-planned growth." Scrubbers do exist and can be used. If scrubbers aren't used, the plant would emit 77 percent of the 3-hour SO_2 National Ambient Standards within 3 miles of the site. The Draft statement states that "this would preclude development of other large SO_2 emitting industries within the immediate area of the Emery plant" - what does this mean for the two additional units that Utah Power and Light hopes to build there. There is also the fact that pollutants are not merely dispersed in the atmosphere - they are added to what's in it and may emerge in a different form at a distance far from the plant.

Response: The text has been revised to clearly state EPA's position in the main body of the statement, see Chapter 8, Section C, Alternative Plant Design and Removal System.

(4) Comment: Need. We are always deeply concerned about the construction of new power plants since they are a disrupting force on the environment in which we and our children must live. We, therefore, want to know that there is an absolute proven need for new generating facilities. Does this Draft EIS demonstrate that Utah Power and Light needs the Emery generating capacity for its firm customers in the time frame which it is intended? No, it does not. We do not even have the assumptions on which Utah Power and Light's demand projections are based, much less an independent analytically defensible demand projection that would be based on currently changing social and economic conditions.

Response: As the Utah State Public Utilities Commission is responsible for granting approval of power plants, your question was referred to them. Their reply can be found in Appendix I-6.

L. WRITTEN COMMENTS AND RESPONSES

1. Comments Received

Letter No.	Commenter	Representing
1	Neil E. West	Utah State University
2	Joseph C. Fackrell	Intermountain Consumers Power Association
3	Martin J. Wistisen	Brigham Young University
4	E. Willard	Bonneville Power Administration
5	George C. Weddell	Department of the Army - Corps of Engineers
6	R. D. Lindmark	U.S. Forest Service - Intermountain Forest and Range Experiment Station
7	Harry L. Silcocks	Self
8	Joel B. Murphy	Self
9	Dudley E. Faver	Federal Energy Administration
10	Lynn H. Thompson	National Park Service
11	Robert J. Matuschek	Department of Housing and Urban Development
12	Fred H. Jaeger	Federal Aviation Administration

Letter No.	Commenter	Representing
13	John W. Davies, Lloyd J. Mechan, Jack L. Birch	American Coal Company
14	Frank N. Davis	Utah Power and Light Company
15	Claron E. Nelson	University of Utah
16	Robert H. Shields	U.S. Fish and Wildlife Service
17	Peter Hovingh	Self
18	Patricia C. Dixon	Self
19	Robert Arkins	Bureau of Outdoor Recreation
20	Ralph Cisco	U.S. Forest Service - Fishlake National Forest
21	Virginia J. Sorenson	Self
22	Mrs. Joel Murphy	Self
23	Robert H. Hassell	Self
24	Alvin Rickers	State of Utah - Division of Health
25	Jack Beckner	Peabody Coal Company
26	George D. McMillan	Soil Conservation Service
27	Charles Custard	Department of Health, Education, and Welfare
28	Jan Johnson	Utah Environment Center
29	Gordon Anderson	Friends of the Earth
30	Charles M. Albrecht	U.S. Geological Survey
31	Nina Dougherty	Sierra Club - Utah Chapter
32	James E. Kee	Utah State Planning Coordinator
33	C. V. Anderson	Utah Department of Transportation
34	Donald A. Smith	Utah Division of Wildlife Resources
35	Mary Belle Bloch	Environmental Defense Fund
36	Thomas V. Falkie	U.S. Bureau of Mines
37	John A. Green	Environmental Protection Agency
38	Louis C. Wall	Advisory Council on Historic Preservation
39	P. M. Rees	U.S. Forest Service - Regional Office
40	Reed C. Christensen	U.S. Forest Service - Manti-La Sal National Forest

2. Responses to Written Comments

a. Neil E. West, Utah State University, College of Natural Resources (Letter No. 1)

(1) Comment: Of particular concern was your complete lack of acknowledgement of the presence and importance of crypotogamic plants. Soil crypotogamic crusts, composed of mosses, lichens and algae, have been found to be of great importance on the Colorado Plateau in holding the soil together and contributing nitrogen to these ecosystems. I have enclosed for your consideration a recent review paper which summarizes what is known about these cryptogamic crusts and the known and potential effects of man and his activities upon them.

Response: Studies (Bennett and Hill, 1973, and Hill, et. al., 1974) indicate that sulfur dioxide (SO_2) concentrations of 0.5 parts

per million for 3 hours with equal amounts of nitrogen dioxide (NO_2) are required to cause injuries to the most sensitive vegetative species. Air modeling studies by H. E. Cramer indicate, under a worst case projection, that the SO_2, NO_2, and particulates would be below those levels known to damage lichen and other cryptogamic plants. See Air Quality, Section C, Chapter 3, for a thorough discussion of this matter.

b. Joseph C. Fackrell, Intermountain Consumer Power Association (Letter No. 2)

(1) Comment: Even with a maximum conservation effort, (which we fully support) the total energy requirement of the Nation will probably continue to grow at a rate exceeding 3% per year.

Response: The discussion on Delay, Chapter 8, Section L, points out that "during the 1975 to 1980 period the national growth of electrical demand is expected to be 6 percent." Utah Power and Light estimates their growth rate to be 9.1 percent per year as stated in this same section. At least for the short term, according to UP&L projections, a rate of 3 percent is exceeded. There are no other data available to indicate otherwise.

(2) Comment: Electric growth rates will be substantially higher than for other energy forms, probably about 6% per year.

Response: See response to the preceeding comment.

(3) Comment: Growth rates in Utah will be higher than the national average.

Response: According to the National Bureau of Census, the size of the average family in Utah is 3.49 compared to a national average of 3.2. All available data indicate this fact. See response to first comment.

(4) Comment: Substantial unemployment and economic stagnation could result if energy requirements are not met in a timely manner.

Response: The sections on Delay and No Action in Chapter 8 point out that a delay in the Emery project would require electricity to be purchased from other companies. In all probability, UP&L would also accelerate the construction of Units 4 and 5 at Naughton, near Kemmerer, Wyoming. Therefore, an attempt would be made to meet power demands from other sources in order to prevent unemployment or economic stagnation. However, your assumption is not supported by recent studies by Stanford University for the Federal Energy Administration, in which it was stated that Switzerland and Sweden produce the same gross national product per person as the United States, but use only one-half the amount of energy.

(5) Comment: Further reliance on imported petroleum as an alternate to coal is imprudent and unwise.

Response: It has been pointed out that future availability of oil and gas is questionable, therefore, petroleum is not a reliable energy substitute. See discussion under Oil and Gas, Other Energy Sources, Section J, in Chapter 8.

(6) Comment: There is no other viable source of needed energy for this area if the Emery plant is not made operational.

Response: See response to Comment No. (4) above.

(7) Comment: We also question power from other sources being available for purchase on any sort of firm basis as suggested on Page 8-185. Further, there is no assurance that the construction schedule for the Naughton units can be accelerated.

Response: Information to determine to what extent the construction schedule for the Naughton units can be accelerated is not available. However, this is considered as an alternative to a delay and no action decision by UP&L.

c. Martin J. Wistisen, Brigham Young University, Center for Business and Economic Research (Letter No. 3)

(1) Comment: On Page 3-78 income projections are displayed which raise a number of questions. The income multipliers displayed appear to be of the Type 1 variety obtained from an 1/0 model. Just where they came from and the justification for using them are not provided. Since it appears that the purpose of Table 3-15 is to estimate total income and since total employment in Table 3-15 is the same as is shown in Table 3-11, there appears to be absolutely no justification for using income multipliers in Table 3-15. If we adjust for the effect of the improper use of the income multipliers in the computation of total income, then total income from the project in 1981 is only \$15.6 million rather than the \$21.8 million used in the study. Therefore, the Statement has overstated the income related to the project by 40 percent. Estimates of sales taxes should also be adjusted accordingly.

Response: The multiplier for Table 3-15 has been changed to provide new income projections based on UP&L employment figures. The source of the multiplier has been indicated. Sales tax figures have also been adjusted in Chapter 3, Section M, Human Resources.

(2) Comment: No attempt has been made in the Statement to estimate the magnitude and timing of front-end public infrastructure costs. It seems essential that these projections be made at least for Carbon and Emery Counties as a whole and for specific impacted communities.

Response: Front-end infrastructure costs were not considered since most of the impacts occurred during construction of the Huntington power plant. The Emery plant construction began at a time when construction of the Huntington units was nearing completion. Therefore, the Emery

project is a continuation of an earlier critical boom which possibly avoided a period of economic downturn when the Huntington plant was completed. Other coal mining activities have further complicated the socioeconomic impacts in Carbon and Emery counties.

(3) Comment: With regard to the section on taxes, it is not clear what kinds of taxes and which energy developments are included in the "$2 and $7 million in additional taxes by 1985 to Carbon and Emery counties" referred to on page 3-70 of the Statement. Furthermore, no analysis was done as to how taxes will be distributed between governmental units or whether the timing of tax receipts will be such that they can be used for necessary capital improvements in time to accommodate the expected population.

Response: The timing and distribution of taxes has been added to Chapter 3, Section M, Human Resources.

(4) Comment: The sources listed in Figures 3-9 and 3-10 suggest that use was made of the SAFE-UPED Model 1975. Although footnote #3 of Table 3-11 (which incidently is a completely incomprehensible description of what was done let alone why it was done) suggests that some other methodology (in addition to or in place of SAFE-UPED) was used to estimate the impacts on secondary (service) employment. The reader deserves the basic courtesy of being informed as to what forecasting methodology was used, its underlying assumptions, its primary strengths and weaknesses, and the justification for its use as opposed to alternative forecasting methods.

Response: The forecasting methodology utilized in the statement is described in The Utah Process Alternative Futures, Volumes I and II (SAFE-UPED Model Documents). The reference is cited in Table 3-11. Further descriptions pertaining to this table have been clarified.

(5) Comment: On Page 3-81 it states that "About 75 percent of the plant operators and miners would probably live in Price and Helper." Although this may be true during the initial years of the project due to the inability of the much smaller Emery County communities to provide services for the impact population, as the Emery County population and service base grows it should be expected that a larger proportion of people will begin moving into Emery County communities from Price and Helper to avoid the daily 70 to 80 mile commute. The Statement has failed to pinpoint how much of the initial and final impact is expected to be in Emery County relative to Carbon County. Emery County is in a much more precarious state with regard to providing community services for a large population influx than the Price-Helper area. Due to this fact the Statement should have more clearly delineated the specific impacts on each of the small Emery County communities.

Response: A change has been made which indicates that only 50 percent of the operators and miners would probably live in the Price-Helper area. The daily commuting distance from the Price area to the Emery plant is about 60 miles, round trip. The impact of the Emery power plant on each individual community cannot be assessed since most

of the impacts occurred before construction began on the Emery power plant and were distributed over a wide area. Data are not available which would allow evaluation of impacts to specific communities.

(6) Comment: As indicated in the Statement, there is and will occur tremendous socio-economic upheaval in Emery County as a result of this project. However, the Statement did not even attempt to delineate between the positive and negative impacts on the indigenous population. It is expected that many people in Emery County will not benefit either directly or indirectly from the project. In fact, these people, in some instances, may suffer serious socio-economic costs. Who are these people? How will they be hurt? And what ameliorating actions should and could be taken to mitigate some of the adverse impacts of the project on these people? These are questions the Statement ignores.

Response: That portion of the indigenous population that would be adversely affected has been identified and added to Chapter 3. Even though many impacts are being mitigated (as discussed in Chapter 2) there are still additional impacts. The mitigation of these additional impacts is the responsibility of state and local entities. Therefore, mitigating actions, which are under state and local jurisdiction, were not included, the reason being that these mitigations cannot be established or enforced by those federal agencies now preparing the ES, who are involved in the federal actions (permits, leases, etc.) required for construction of the project. Chapter 3 provides information on social impacts to be anticipated. It is hoped that the environmental impact statement, as well as the hearing held on the project, will alert the communities to the impacts that may be anticipated and will guide their community planning. Likewise, the state agencies should be similarly alerted to their role in assisting the communities with these problems with the anticipation that both state and federal assistance programs might be explored. Also, there has been consultation between the communities and the applicant which should be helpful in exploring areas of cooperation to mitigate certain adverse impacts on the population. See Chapter 4, Section E, Evaluation of Mitigating Measures.

(7) Comment: In my opinion, better treatment of the socio-economic impacts expected in Carbon-Emery Counties is contained in a study done by Evan Turner entitled The Impacts Associated With Energy Developments in Carbon and Emery Counties, Utah: Part 1 - Economic and Demographic Impacts. This study was co-sponsored by the Utah State Office-USDI, and the Bureau of Land Management through the Utah State Science Advisor. It is puzzling why not even one reference was made in the Statement to this study.

Response: The study by Evan Turner pertains specifically to coal development and the proposed Intermountain Power Project. It does not contain any information regarding the Emery power project and, therefore, was not used as reference material.

d. E. Willard, Bonneville Power Administration (Letter No. 4)

No response required.

e. George C. Weddell, Department of the Army, Corps of Engineers (Letter No. 5)

No response required

f. R. D. Lindmark, United States Department of Agriculture, U.S. Forest Service (Letter No. 6)

(1) Comment: On Page 1-85 under "Reseeding," the statement is made that "species mixtures native to the site would be first choice, if available." Although it is desirable to include superior native species, various introduced species have proven equally successful on many range lands, and some have a distinct advantage over native species from the standpoint of seed availability and quickness of establishment. It is preferable to use both native and introduced species on these sites.

Response: The statement relating to native species as first choice has been deleted.

(2) Comment: Comments are made in several places that it would be a long-term program to revegetate certain areas. Present knowledge indicates that time required for successful establishment can be greatly reduced by use of containerized plants, especially shrubs, on critical areas where immediate success by direct seeding might be questionable.

Response: Containerized plants do offer certain advantages in terms of time required for successful establishment. However, because only 349 acres would require reseeding (252 acres of this total involves tower pads), clearing would be held to a minimum, scalping of the top soil would not be permitted, and critical areas would not be disturbed (such as municipal water sheds and critical water yielding areas). It was determined that reseeding would be the most efficient and most economical for rehabilitation.

(3) Comment: The statement on Page 6-10, that "increased activity would add to the pressure on threatened and endangered species," is highly presumptive. At this point, it is unknown what threatened or endangered species would be involved--if any--and/or what their requirements are for maintenance. The areas should be checked for these species, but not ruled out if any are found.

Response: The statement was made in regard to the San Rafael Swell where collections have been made by Dr. Stan Welsh of Brigham Young University. He has identified 15 plants which are either endangered or threatened in that area. Another 12 species in the area could also be considered for placement on the threatened and endangered list.

(4) Comment: Although disturbance often disrupts ecosystems, it can also create diversity of habitat for small animals, birds, and even large game animals, and, thus, improve the overall environment for these species. In other words, with astute planning, some adverse impacts of disturbance can be mitigated. It would be highly desirable to utilize some landscape architecture in rehabilitation programs which seek to provide soil stabilization, wildlife habitat, esthetics, etc. on disturbed areas.

Response: In some cases disturbance of an area can create a diversity of habitat for small animals, birds and even large game animals. However, since only small acreage (349 acres), scattered over a large geographical area (central Utah) would be disturbed, the creation of new habitat would not be important in terms of quality and quantity. The same is also true of using a landscape architect in rehabilitation programs.

(5) Comment: The word "saltbrush" is used to refer to Atriplex species throughout the report, whereas the correct word is "saltbush." Also, the list of species on Page 2-119 contains several spelling errors and common plant names that are not in standard use. A copy of this page is attached showing suggested corrections.

Response: The word "saltbush" has been inserted throughout the text. The Appendix also has been corrected as suggested.

(6) Comment: Another minor comment: The map on Page 2-117 does not include the symbol "An" in the legend, although it is used in the diagram. We assume that it could mean "annuals," but this isn't clear.

Response: The map has been corrected to include the term "annuals."

g. Harry L. Silcocks (Letter No. 7)

Comment: I would like to ask one question that I would like to see answered in the final EIS. Why, in Part B, Chapter 4, is there no mention of powerline design to prevent raptor electrocution, while on Page 8-54 it appears that the authority to require proper powerline design is granted under an act passed in 1911. On Page 4-8 the same act is referred to as the basis of authority requiring certain procedures at the Emery site. Why can you require powerline design to protect raptors at one location and not require the same feature at other sites?

Response: In Chapter 4, Part B, Measures Required of the Applicant by Federal Agencies, no mention was made of raptor electrocution because the minimum distance between conduction on a 345-kV transmission tower structure for the proposed project is 24 feet, which would preclude electrocution of raptors (see Transmission Line section, Chapter 1). In Chapter 8, the Right-of-Way Act of March 4, 1911 was cited in relation to raptor electrocution because the alternative proposal calls for a 69-kV transmission line to either pumping station. The 69-kV lines, which have less than a 43-inch line spacing, have caused the electrocution of

raptors. In order to prevent raptor electrocution should the alternative be used, BLM would use the authority given under the Right-of-Way Act to design the power lines to prevent raptor electocution.

h. Mr. and Mrs. Joel B. Murphy (Letter No. 8)

(1) Comment: We will not lose our home. We will be left to look at the gross monstrosity every day. We'll have the constant reminder everyday when we sit down to eat our breakfast. Our children will wait for their school buses right underneath this powerline. Many will have to drive underneath this powerline to go to their homes everyday. I'm wondering what will happen to those of us that will try and sell our homes. Will we get fair market value when we have a 345 kV Transmission Line sitting in our backyards?

Why should UP&L be allowed to exercise such unnecessary control of this nature? They certainly have shown total disregard to human beings where the location of the transmission line is concerned.

Response: A government appraiser has analyzed changes in market values near the proposed transmission line. The appraiser found that property values would decline for a short time, then regain lost value. He found that within a very short time property values near the power line became the same as property values more distant. The evaluation of this analysis can be found in the Human Resources sections of Chapters 2 through 7. Utah Power and Light is a public utility and has been mandated to supply needed electricity within its service area. The company has been granted power of eminent domain under Utah law. If it can be proved in a court of law that there is no practical alternative to a proposal, UP&L may condemn property upon compensating the owner to obtain needed rights-of-way.

(2) Comment: Everyone agrees that power is needed. When it comes to running the line down residential and densely populated areas, that's where the controversy starts. Surely there are other areas better suited for "proper utility practices". Why not west of the lake?

Response: An analysis of impacts for an alternate transmission route running south of Utah Lake, then northward up the west side, is discussed in Chapter 8, Section I, Transmission Lines.

i. Dudley E. Faver, Federal Energy Administration (Letter No. 9)

(1) Comment: A check with the Utah Power and Light Company indicates that Emery No. 1 has been under construction for well over a year, is proceeding on schedule, and should be on line by April 1978. Unit No. 2 is well into the engineering stage and will target in on line date of 1981. The EIS is quite misleading, particularly in the alternatives section in that the EIS is written as if no construction had been initiated. The alternate plant sites, water and service lines could not be considered seriously as alternates since large capital expenditures and materials

have been committed at the prime location. In this respect it would appear that this EIS is not following the prescribed NEPA process.

Response: The Emery power plant is being constructed on private land, which is outside the jurisdiction of the Federal Government. This unique situation and the possible consequences of selecting an alternative are discussed in the introduction to Chapter 8. Also see response to General Comment No. 1.

(2) Comment: The statement covers most plant and mine related environmental aspects quite well, although there is a lack of cohesion and completeness with reference to the energy portion of the document. The information which addresses energy and energy utilization is scattered (pages 6-14, 7-9, 7-10, 8-169) and does not present a true picture of actual input VS output BTU values that would display the energy efficiency of the operation. It is suggested that the BLM consider a concise net energy analysis for the proposed action. A paper on this subject was forwarded to the BLM from the regional office on August 18, 1976.

Response: The information in Chapter 6 of the Draft Statement pertains to the replacement of oil and gas with equivalent amounts of coal British thermal units (Btu). The information in Chapter 7 pertains to the energy that would be irretrievably lost once the power plant is built and goes into operation. Chapter 8, Alternatives, discusses the comparison of coal utilization to other sources. To help identify the actual input versus output Btu values, a section on net energy analysis has been added to Chapter 6.

(3) Comment: The EIS does not adequately cover the extent of the reserves at the Wilberg Mine. The Wilberg Mine is mining from the Hiawatha Bed and the adjacent Deer Creek Mine is mining from the Blind Canyon Bed, both of which will eventually overlap; however, no mention was made on other coal beds and other possible resources in the mining area. This discrepancy could be cleared up by addressing the following:

A more comprehensive description is needed on the coal geology in this area including the underlying and overlying coal beds not being mined. Coal literature1/ indicates that an Upper Bear Canyon Bed and an Upper Hiawatha Bed may exist in the mining area. If these beds are present, are they economical to mine? Data one way or the other should be made available. See enclosure "A".

1/Reference to "Wasatch Plateau Coal Field," by H. H. Doelling, January 1971, Utah Geological and Mineralogical Survey.

Response: The applicant has submitted additional information on the mining plan. Both the Hiawatha Bed and the Bear Canyon Bed would be mined. This additional information has been included in the text.

(4) Comment: A Geological Stratigraphic column showing coal beds and other possible energy bearing formations (i.e., oil, gas, uranium) should be included.

Response: The coal beds overlying and underlying the Wilberg Mine

are not considered economical to mine, except the Bear Canyon Bed which lies directly above the Hiawatha Bed. Other energy bearing formations (i.e., oil and gas) would not be affected by the proposed action. Therefore, a stratigraphic column was not included in the statement.

(5) Comment: It was noticed, according again to literature reviewed, that the Ferron, Emery, and Dakota Formations contain coal in certain areas in the Wasatch Plateau. Is this true of the Peabody area? If so, is the reserve economical to mine?

Response: The Emery sandstone and Dakota Formations (minor coal seams) and the Ferron sandstone (major coal seams - mined in other areas) lie some 3,500 to 4,500 feet below the Wilberg lease and would not be economical to mine because of the depth.

(6) Comment: Include a discussion addressing the exploration activities for other mineral resources. For example, information reviewed about Emery County indicates a good possibility for oil and gas and a fair possibility for uranium in the mining area. Subsidence mining would make future extraction of these resources extremely difficult, if not impossible; consequently, timely exploration should be accomplished prior to large-scale mining.

Response: Although the Wasatch Plateau is potentially valuable in oil, gas, and uranium, any subsidence which would occur from coal mining would not affect the extraction of these fuels, which are located a considerable depth below the coal beds.

(7) Comment: Subsidence, in the magnitude of 1-10 feet, was discussed on pages 5-11 and 12. According to the presented information, subsidence in this area can be expected to occur quickly and severely. Since underground aquifers undoubtedly will be intercepted and changes will occur in surface drainage, a comprehensive effort should be undertaken to research the cumulative effect on drainage patterns and water quality caused by these mines and others that may alter present water conditions. Ranchers and others holding water rights have the right to the same quality and quantity of water during and after mining as they had previous to large-scale mining. Only adequate planning before, during, and after mining will ensure that the conditions will continue.

Response: Subsidence of from 1 to 10 feet could occur on 4,658 acres as a result of mining both the Bear Canyon and Hiawatha seams. At present, both Peabody Coal Company and the USGS are initiating studies to determine the effects of subsidence on the aquifers and surface drainage. Because the limited information at this time, the effects of subsidence cannot be predicted. See Chapter 4, Section F, Monitoring Requirements.

(8) Comment: The most serious question with respect to this entire energy development is the availability of an adequate water source both for plant operations and the population growth increase. This question was discussed with personnel with the Utah Power and Light Company and

seems to remain open as to the exact resolution. Since the success of the operation depends upon this resolution, it is suggested that the Final EIS include added data and alternatives.

Response: Studies have been conducted by UP&L and BLM (Voorheis, Trindle, and Nelson [VTN] contract and preliminary working documents by ES team members) dealing with the availability of an adequate water source for both plant operations and population growth. It was determined that an adequate supply would be available; water for plant operation and population growth is being converted from present irrigation use (See Water Resources, Chapter 2 and 3).

(9) Comment: The Draft EIS covers problems encountered in the socio-economic area (i.e., inadequate housing, police protection, fire protection, water, schools, etc.), but there is a noticeable lack of solutions and discussions as to how the companies involved plan to help solve the problem. It is quite obvious the major impact in this area is due directly to development of power plants and coal mines by Utah Power and Light and the Peabody Coal Company, respectively; but the lack of front-end funds, company guidance, and overall help for the impacted communities is also quite apparent. Other areas of concern expressed by our regional office of Socioeconomic Impacts are as follows:

Response: See responses to Comments (2) and (6) Letter No. 3.

(10) Comment: Changes in both mining and agricultural activities aligned with changes in demand for land have impacted housing in the county quite negatively. Additional statements relative to zoning and code enforcement added to chapters 7 and 8 would bring added awareness to the problem.

Response: The BLM does not have the legal authority to enforce local zoning and planning ordinances. Such enforcement is the responsibility of state and local governments. To date, the local governments have not committed themselves to enforcement of zoning regulations or additional planning. Therefore, only the impacts are identified in the Human Resources section M, of Chapters 3 and 5.

(11) Comment: Property tax data (pages 2-83) could be enhanced with additional property tax data provided in 1976 WGREPO study, Taxation of Coal Mining Review.

Response: The tax bases from the Western Governors' Regional Energy Policy Office study were not applicable, since they seem to consistently under estimate. However, the tax data from the Utah State Tax Commission were used to enhance the tax base part of section M, Human Resources of Chapters 2 and 3.

(12) Comment: In chapters 7 and 8 reference to several 1975 Utah State Legislature acts impacting the county (namely, Utah Resource Development Act, Building Schoolhouses Act, and Special Service District Act) would alert users of the EIS to appropriate legislative checkpoints.

Response: Since publication of the Draft Statement, Emery County has utilized the Special Service District Act to form a Special Service District. However, no money has been appropriated to date for the District. This is discussed under Income and Employment in the Human Resources, section M, of Chapter 2 and 3. It might be appropriate to discuss the other two acts indicated in Chapter 4, Mitigating Measures. However, these acts have not been implemented, since the counties have elected to continue with traditional bonding and granting procedures.

(13) Comment: Emery County shows significant increase in assessed evaluation and increased county revenues but the county financing for planning, including zoning, is minimal (see DRI report, July 1976, Analysis of Financing Problems in Coal and Oil Shale Boomtowns, Appendix D). No mention is made of proposed "labor camp" for construction workers (proposal by Utah Power and Light) or mobile home court (Peabody Coal).

Response: That portion on tax base in the Human Resources section M, of Chapter 2 has been changed to incorporate the information contained in the Denver Research Institute report. Discussions with UP&L and Peabody Coal Company indicate that neither a labor camp for construction workers nor a mobile home court are planned.

(14) Comment: Emery County officials are working to form a special service district. Some reference should be made to same, as it is relative to land use and management, particularly for the town of Huntington.

Response: See response to Comment No. 12 above.

j. Lynn H. Thompson, National Park Service, Rocky Mountain Regional Office (Letter No. 10)

(1) Comment: Since the National Register of Historic Places is a changing document with the continuous addition of new listings, we suggest that this be again consulted in the future so as to make certain that no new sites listed will be adversely affected by the implementation of the proposed project development.

Response: The National Register of Historic Places has been rechecked. No new listings have occurred since publication of the Draft Statement.

(2) Comment: There is a need to address the several comments made by Mr. Milton L. Weilenmann, State Historic Preservation Officer, by his letter of June 22, 1976, reproduced on Page 2-125 of the draft environmental statement. By such action, the Bureau of Land Management would then be in a position to determine if the preferred project development area, based on all known cultural resource data, would have less adverse impact upon cultural resource sites than the alternative sites considered.

Response: Surveys are now complete for all transmission lines and are now part of this statement, also chapter 8 contains discussions of alternatives and the subsequent impacts to cultural values. The new data now answers Mr. Weilenmann's comments.

(3) Comment: The summary states that "Stack emissions could also cause a reduction in visibility and could produce an evident yellow discoloration of the air."

The text, on page 3-18 indicates: "Under limited dispersion conditions, if the 0.37 ppm NO_2 concentration level was reached, a yellowish discoloration would also be observed." Table 3-4 shows in all three model projections that 3-hour maximum ground level concentration will reach 0.37 ppm. If ground level concentrations are that high 3 kilometers downwind of the stack, then higher concentrations would certainly occur at elevations above ground level and over an undefined distance from the stack. This argues for the substitution of the word "would" for "could" in terms of the production of evident yellow discoloration.

Response: Ground level concentrations of NO_2 would be approximately twice the expected concentration at any given distance from the emission point because of reflection from the surface. Concentrations at elevations above ground level would, therefore, be lower because of diffusion and decrease with distance from the emission point. The word "would" was changed to "could."

(4) Comment: It is also disappointing to note that there have been no projections, or modeling, of the visibility impacts of the Emery plant specifically. The only effort in this direction is an unconvincing attempt to draw parallels between the existing Huntington plant and the Emery project. Studies of the Huntington plant are also incomplete. The phrase on page 3-27 referring to the Huntington plant study " * * * before possible impacts of power plant emissions on visibility can be fully determined, it will be necessary to sample air under highly stable conditions and during the period of highest relative humidity." Indicates that even if the comparison between Huntington and Emery were convincing, the opportunity to complete the Huntington study evaporated with the breakdown of the plant.

Response: Inferences were made to the Emery plant, based on experiences at the Huntington plant. The Huntington plant represents a "worst case" condition because of its location in Huntington Canyon. If there were a visibility problem with this size power plant, it would occur in Huntington Canyon because of the limited atmospheric dispersion conditions. As pointed out in the Visibility section under Air Quality, Section C, Chapter 3, during a study conducted by Clyde Hill, "---it must be concluded on the basis of the data that emissions from the Huntington power plant had no significant affect on visiblity during the sampling period." Better dispersion conditions exist at the Emery site than at the Huntington site because of the flat terrain. Therefore, if visibility problems have not been encountered at Huntington, such problems would not be expected at Emery because of the better pollution dispersion conditions.

(5) Comment: As development and other disturbances of soil surface proliferates in the west, the effects of air-borne dust on visibility becomes increasingly a matter of concern. Dust has traditionally been accepted as a normal and natural constraint to visibility in this country,

particularly during periods of high wind. It is, however, indicative of the growing problem to note the comment on page 3-26 in the draft EIS that the most striking difference in visibility between pre-Huntington and post-Huntington periods was an increase in reduction in visual range due to soil dust of about 50 percent after the Huntington plant was installed. Soil disturbances which loosen soil particles are the major source of wind-borne dust. The cumulative effect of small disturbances are as important as major ones, and they are considerably more difficult to mitigate. This draft EIS recognizes, but does not attempt to quantify, the impact of visibility of dust, resulting directly and indirectly from construction and operation of the power project.

Response: The particulate contribution to the atmosphere by the Emery plant stack would will be less than 1 percent of the NAAQS. This would be the result of the predicted 99.5 percent efficiency of the electrostatic precipitators. The effect of soil dust on visibility at Huntington was probably due to low rainfall and the increase in human activity in the area. These nonpoint sources of fugitive dust emissions can be minimized by paving roads and parking areas, covering coal storage areas, and seeding disturbed areas. In the Visibility section under Air Quality in Chapter 3, it was stated that the direct impact from particulate stack emission would be minimal for Emery.

(6) Comment: The National Ambient Air Quality Standards address accumulated concentrations of controlled pollutants regardless of the number, type or distribution of sources impacting a particular air space. Table 3-4 displays information as if the standards were controlling on the basis of incremental increases rather than cumulative pollutant loads in the air space. This is not, apparently, significant in most controlled concentration levels except that it would indicate that cumulatively a larger percentage of the permissible pollution loading would occur as a result of the plant, thus limiting options for future growth in the area. There are two areas where it may be significant. The first is the anticipated maximum ground level concentration of SO_2 over a 3-hour period. Incremental increases expected from the Emery plant, from Table 3-4 are a significant part (77 percent to 55 percent) of the total permissible under the ambient air quality standards. There is, in this case, no data provided for the background concentration. Background concentrations amounting to only 24 percent to 46 percent of the permissible standards would, if the incident coincided with the emission of maximum concentrations of SO_2 from the plant over a 3-hour period, result in violations of the secondary ambient air quality standards.

Response: The NAAQS are concentration levels of specific pollutants that endanger human health or welfare. Concentrations less than these levels have not been determined to be harmful to human health or welfare. The predicted pollutant concentrations are expressed in Table 3-4 as a percent of the ambient air quality standards to show the extent of the predicted impact relative to these standards. This infers that concentrations less than the standards have not been determined to be harmful to human health and welfare.

Approaching the air quality standards will limit the options

for future growth in the area. For example, it would be inadvisable to allow construction of another major SO_2 emitting source in the area, unless the cumulative impact of the sources were less than the ambient air quality standards or less than the Prevention of Significant Deterioration Increment for which the area was classified.

Background SO_2 concentrations around the Emery site were found to be 0.002 parts per million (p/m) for an annual average and 0.003 p/m for the highest 24-hour average. Both levels are almost below the point of detectability, and the 3-hour average would be in this same very low detection range. It is highly unlikely for the background SO_2 concentrations to ever have any significant cumulative impact with the proposed Emery plant SO_2 emissions.

(7) Comment: The second is as it relates to particulates. The annual maximum ground level concentration from stack emissions in concert with natural background concentration from stack emissions would amount to 52 percent of the concentrations allowed under secondary ambient air quality standards. This ignores the unquantified volume of particulates in the form of dust resulting from an aggregation of project-related sources. The maximum concentration of particulates over a 24-hour period is also not really known because there is the neglected aggregation of sources mentioned above and is no quantification of natural background concentrations which should be added to stack emissions to determine the percentage of the standard filled to date.

Response: The cumulative effect of stack emissions and natural background concentrations amounts to 31 micrograms per cubic meter ($\mu g/m^3$) or 52 percent of the secondary ambient air quality particulate standard. However, 97 percent or 30 $\mu g/m^3$ of this total (Table 3-4) would consist of the natural background level and not stack emissions. This daily particulate concentration will fluctuate, but the 30 $\mu g/m^3$ value, which is the yearly average, is an indication of the low background particulate concentrations in the area.

(8) Comment: The effect of these factors is that it has not been demonstrated that the project would meet secondary ambient air quality standards for maximum 3-hour ground level SO_2 concentrations, and maximum annual and 24-hour ground level particulate concentrations. This is not consistent with the statement, "These stack emission levels would equal, or better, the applicable air quality standards" contained in the summary.

Response: In Table 3-3 under limited mixing conditions, the Class II Prevention of Significant Deterioration Regulations (PSDR) may be exceeded. An additional meteorology study recently completed under a BLM contract indicates that Class II standards would be met. Data from this study is included in the Final Statement. Table 3-4 shows that the Emery emissions would be no more than eight percent of the NAAQS.

(9) Comment: The discussion of the environmental impacts of the Garfield alternatives does not include any mention of the effects on aquatic or riparian ecosystems that would result from the construction of an impoundment on the Escalante River. This would be the most immediate, aside from

possible silting during construction, and potentially the most devastating of the impacts associated with the Garfield alternatives.

Response: The Escalante River contains an aquatic ecosystem primarily comprised of suckers, chubs, shiners, and dace which are not unique to to the Escalante Drainage. These species occur throughout most live drainages in the region, which have diversion works or other natural obstacles (waterfalls). For example, the Fremont River has a large diversion works at Hanksville which has not affected the aquatic ecosystem. These species thrive above and below the diversion works. The riparian ecosystem is discussed in the Water Resources section and the Vegetation section, Part 2, under Garfield sites in Chapter 8. The siltation during construction would probably be no greater than that predicted for the Kaiparowits proposal, which was estimated to be less than 1 percent increase over natural siltation.

k. Robert J. Matuschek, Department of Housing and Urban Development (Letter No. 11)

(1) Comment: We wish to comment first on the statement (see chapter 4, page 17) to the effect that the presentation of mitigating measures for impact on human resources is beyond the scope of the draft EIS because "Mitigation of impacts to human resources does not presently come under the jurisdiction of any Federal Government agencies, nor have the state, local agencies, or company made commitments." This position appears to us to be incompatible with the Council on Environmental Quality Guidelines of 1973. Part 1500.2 of the Guidelines states the following: "In particular, agencies should use the environmental impact statement process to explore alternative actions that will avoid or minimize adverse impacts and evaluate both the long and short term implications of proposed actions to man, his physical and social surroundings and to nature. Agencies should consider the results of their environmental assessments . . . and use all practicable means, consistent with other essential considerations of national policy to restore environmental quality as well as to avoid or minimize undesirable consequences for the environment." Part 1500.8(a)(3)(ii) of the Guidelines which stresses the importance of indirect impacts, states that indirect impacts on existing patterns of social and economic activities may be more substantial than direct impacts and points out that "the effects of the proposed action on population growth may be among the more significant seconadary effects."

Response: Only those mitigating measures were addressed which were considered real or committed and enforceable. Even though many impacts are being mitigated (as discussed in Chapter 2, Section M, Human Resources) there are still many additional impacts. The mitigation of these additional impacts does not come under the jurisdiction of the Federal Government. Therefore, mitigating actions, which are under state and local jurisdiction, were not considered in the final statement as such actions cannot be considered as real or committed. See response to Comment No. 6, Letter No. 3.

(2) Comment: We are extremely concerned about the socio-economic impacts (including the availability and cost of housing for lower income people) of the population growth that will occur in Carbon and Emery Counties as a result of the power plant construction and associated coal mining activity. We are informed, in chapter 2, pages 80-84, that prior to the start of the Emery Project, the population of Carbon County grew by 13.1% to 17,700 people and the population of Emery County increased by 21% to about 6,800 people as a result of renewed mining activity and power plant construction in the area. The adverse effect of this population growth on the availability and cost of housing is described on page 84 of chapter 2. In chapter 5, page 22, a housing shortage is projected for the next five years in Helper, Price, Huntington, Castle Dale and Ferron, with a need for 1500 new homes for the new employees at the Emery Project and a continued rise in the price of homes.

We urge that the Final EIS on the Emery Project address the socio-economic impacts, including the housing problems referred to above, with proposals for mitigation of the adverse socio-economic impacts.

Response: Chapter 2 has described current conditions and anticipated socio-economic impacts in the local communities. However, the mitigating actions are primarily the responsibility of the state and local jurisdiction and do not come under Federal Authority. Also see response to Comment No. 1.

(3) Comment: In regard to mitigation of socio-economic impacts, we should like to call your attention to Section 9.(a) of the Federal Coal Leasing Amendments Act of 1975 (Public Law 94-377, August 4, 1976). We recommend that you contact the appropriate officials of the State of Utah in order to determine the State's plans concerning the use of funds referred to in Section 9 of the Act for mitigation of the socio-economic impacts of the Emery Project. We further recommend that the State's plans in this regard be presented as part of the Final EIS on the Emery Project.

Response: At the present time, the State of Utah has no mechanism or plans to distribute monies collected under Public Law 94-377. Therefore, the provisions of the Act cannot be considered mitigatory.

l. Fred H. Jaeger, Federal Aviation Administration (Letter No. 12)

Comment: However, the routing of the transmission line near the Provo Airport should be carefully considered so as to not be a hazard to aviation.

Response; Consideration for human health and safety as it pertains to the airport is discussed in Chapters 2 through 7, (Human Health and Safety). The alternative to constructing the line underground near the airport is discussed in Chapter 8, Section I, Alternative Transmission Lines.

m. John W. Davies, Lloyd J. Mechan, Jack L. Birch, American Coal Company (Letter No. 13)

No response required.

n. Frank N. Davis, Utah Power and Light Company (Letter No. 14)

(1) Comment: Page 1-9, Table 1-1, Coal. The table states that there will be 84 million tons of coal burned during the projected 35 year plant lifetime. This implies that the plant will operate at an 80% load factor over its entire 35 year lifetime. Over the total lifetime, average conditions pertain. The load factor will probably be between 60% and 65% and the total coal usage will be between 60 and 70 million tons for two 400 mw units.

Response: The 80 percent long-term maximum operating range, which would consume 84 million tons of coal during the life of the project, represents the maximum consumption of coal that could occur. Although less coal would actually be consumed, maximum impacts were analyzed based on the 80 percent long-term maximum operating range. This represents the possible "worst-case" situation.

(2) Comment: Page 1-13 B.(5); The water pipeline from the Millsite Reservoir to the plant will not cross any national resource lands, therefore no right-of-way will be required from BLM.

Response: Reference to the right-of-way has been deleted.

(3) Comment: Page 1-26, D.1., Second Paragraph, Second Line: 3028 MW should be 2968 MW.

Response: The figure has been changed.

(4) Comment: 3028 MW should be 2968 MW.

Response: The number has been corrected.

(5) Comment: Page 1-33, 4.a., First Sentence: Change 260 feet high to 232 feet high, change 270 feet wide to 272 feet wide and change 520 feet long to 528 feet long.

Response: The figures have been corrected.

(6) Comment: Page 1-38 4b, Cooling Towers Third Paragraph: In regard to cooling towers, covered on Page 1-38, it now appears likely that, initially, wet cooling towers will be installed on the two units at Emery. We believe that this is adequately covered in the Alternatives Section, Pages 8-136, 8-137 and 8-138. The dry cooling section still, however, may be added to the two Emery units at some time in the future.

Attached is a water balance covering two units with two wet cooling towers, enclosed as Attachment No. 1.

Response: The water balance sheet has been included under Alternative Plant Design and Operating Methods, Section C, Chapter 8. The correct figure for acre-feet of water utilized by two units with cooling towers has also been inserted.

(7) Comment: The following information is furnished to give the most current information available regarding installation of SO_2 removal equipment on the two units at Emery.

Current construction permits issued by the Utah Department of Environmental Health contemplate the installation of SO_2 removal equipment on these units. The Utah Department has now amended the regulations under which these permits were issued and authorized the Company to apply for authority to operate the units without such equipment under requirements limiting the average sulfur content of coal to be burned to an average of 0.6% or less.

The controversy with the Environmental Protection Agency over the application of significant deterioration regulations should this authority be applied for and granted remains unresolved and is the subject of litigation filed by the Company in the United States Circuit Court of appeals for the District of Columbia Circuit.

The Company's proposal remains unchanged and is to operate the units without such equipment if and when needed approvals can be obtained. Therefore, the statement showing the air quality impacts of this operation is both legally and factually adequate; however, since certain adverse environmental impacts from the installation of such equipment, even though pollutant emissions to the ambient air would be reduced, these impacts should be included in the discussion of this alternative.

These impacts include increased consumption of water, disposal of the waste product from the removal equipment and the consumption of substantial amounts of electric energy in the operation of such equipment.

Response: The information relative to the SO_2 removal systems is discussed in the Sulfur Dioxide Removal Versus Nonremoval section under Alternative Plant Design and Operating Methods, Section C, in Chapter 8. For clarity, this discussion has also been included in the Air Qualtiy section of Chapter 3.

(8) Comment: Page 1-43, Table 1-4: Show SO_2 emissions are for no SO_2 control.

Response: SO_2 emissions without SO_2 control has been added to the table.

(9) Comment: Page 1-66, Coal Conveyor: The decision to install a conveyor will depend upon economic considerations and upon the experience with truck coal haulage for the first unit. The decision will also depend upon the outlook for developing the North Horn coal reserves.

Response: The North Horn coal reserves could be utilized, but the area would not be viable until the Central Utah Regional Coal ES is completed. At present, the primary proposal is described in Chapter 1 reflecting that a coal haul road would be used for the life of the project. The conveyor belt system is described in Chapter 8, Section E, Alternative Coal Transportation Methods.

(10) Comment: Page 1-75: Item 1 General Description - delete last two sentences - the raw water line will not cross any national resource land.

Response: The two sentences have been deleted.

(11) Comment: Page 1-77: Item 1 first sentence top of page - change tank to pond. Should read: "A pressure control pond will be located near Clawson."

Response: The change has been made.

(12) Comment: Page 1-86: The operation of the ash system could be more accurately described as follows: "Bottom ash would be carried in a water slurry from the boilers to dewatering bins. The fly ash collected by the electrostatic precipitator will be collected dry in the fly ash silo. The dewatered bottom ash and moistened fly ash will be hauled by truck 1.3 miles to the disposal area over the ash haul road."

Response: The description has been included in Chapter 1, Part 9, Waste Production and Disposal. However, the distance ash would be hauled has been changed to read approximately 1.0 mile.

(13) Comment: Page 2-59 Item (1) Cultural (Prehistoric and Historic): Field surveys have been made of the Emery-Salina Canyon-Sigurd, Camp Williams-Sigurd, Emery-Spanish Fork-Camp Williams transmission lines. These surveys include extensive surface survey of the line right-of-way and surface salvage of any sites discovered along with complete description and mapping of each site discovered.

Response: This new information has been added to Chapter 2, Part 8, Cultural and Paleontological Resources.

(14) Comment: Between the Emery 345 kv switchyard and the Huntington 345 kV switchyard the Emery-Spanish Fork-Camp Williams 345 kV transmission line will utilize the existing Huntington-Sigurd 345 kV transmission line. This line will be looped into the Emery switchyard. Actual new transmission line construction of the Emery-Spanish Fork-Camp Williams transmission line will commence at the Huntington Switchyard.

Response: The information has been added to Chapter 1, Part 8, Transmission Lines.

(15) Comment: Page 1-80, Figure 1-26: The transmission map does not show the loop into Huntington 345 kV switchyard or the proposed route near Provo.

Response: The map showing the transmission line was intended to portray an overview of the transmission system. Since the 345-kV loop between Emery and Huntington would not create adverse impacts (as that line is in existence) the loop was not shown on the map.

As a result of the change in transmission line routing in the Provo area, a detailed map of that segment has been added.

(16) Comment: Page 1-81, b. Size and Design: See Attachment No. 2 for additional data.

Response: Table 1-10 has been corrected to include the additional data.

(17) Comment: Page 1-85, 9. Waste Production and Disposal: Waste products from alternative SO_2 scrubbers are not included here. Pertinent data on predicted waste products of scrubbers are included as Attachment 3.

Response: Section C, Alternative Plant Design and Operating Methods, in Chapter 8 discusses SO_2 removal systems. This section also covers the waste products disposal from SO_2 scrubbers.

(18) Comment: There have been some minor changes in building sizes. The only one of significance in the table is #49 Paint Shop; the size is 26 feet long, 38 feet wide and 13 feet high. A table of current building sizes is enclosed. Attachment No. 4A & 4B.

Response: The change in the paint shop dimensions has been made.

(19) Comment: Pages 1-127, 128: Attached is photograph of the ultimate double circuit single pole steel structures to be used on the Spanish Fork-Camp Williams Section. Initially one circuit will be installed. Attachment No. 5.

Response: The drawing of the single pole steel structure has been included as Figure 1-29.

(20) Comment: Page 2-83 Item (3) Regional Tax Base: Should use 1975 tax revenue for Carbon and Emery Counties and 1975 UP&LCo taxes. UP&LCo taxes paid Emery and Carbon Counties are as follows:

	1973	1974	1975
Emery	$603,407	$1,208,942	$1,875,949
Carbon	$561,349	$ 606,917	$ 725,040

Response: Taxes paid by UP&L were not broken out of the total property tax figures, except for property taxes paid for the Emery plant, to set a base for describing impacts in Chapter 3, Section M, Human Resources.

(21) Comment: Page 3-9, Table in Middle of Page: Alternative figures for emission with 80% SO_2 removal are attached. Attachment No. 6.

Response: The figures have been included in Chapter 8, Section C, Alternative Plant Design and Operating Methods, with the results of the H.E. Cramer Study.

(22) Comment: Page 3-15, Table 3-4: NAWC's latest report on ambient SO_2 concentrations as calculated for Emery Plant Site Report No. 782-A Title: "Re-evaluation of the Potential Air Quality Impact of the Emery Plant" modifies NAWC's predictions shown on Table 3-4.

Response: The North American Weather Consultant report is based on one unit at Emery using SO_2 control and the other unit without SO_2

control. These data have been included in Chapter 8, Section C, Alternative Plant Design and Operating Methods, since the primary proposal indicates no SO_2 control on either unit at Emery.

(23) Comment: Page 3-40 Water Resources: Recommend that the report by Vaughn Hansen Associates entitled "Salinity Changes in the Colorado River from Development of Coal Fired Power Plants in Emery County, Utah" be included in the list of references and some comments made in this report be included in this section.

Response: The report has been cited in Chapter 3, Section C, Water Resources.

(24) Comment: Page 3-43, Part 2: The statements on increase of Total Dissolved Solids in Rock Canyon Creek due to the discharge of the Emery 001 and 002 drains, do not agree with data that has been obtained on a weekly basis before and after the drains were installed. A tabulation of the test results from 9/27/74 through 5/5/76 are attached. These data show that on the average the TDS concentration in Rock Canyon Creek is lower below the drains than above. There is no detectable correlation between the TDS load of the drain water and that of Rock Canyon creek, other effects completely mask this effect. There is some slight correlation with Johnson Bench Wash TDS and the downstream change in Rock Canyon, but that, too, is insignificant. Attachment No. 7.

Response: These data have been incorporated in the Water Resources, section G, of Chapters 3 and 5. The statement now indicates that no measureable increase in total dissolved solids has occurred in Rock Canyon Creek as a result of the drain installation.

(25) Comment: Page 3-59, 61 & 62 Figures 3-3, 3-4, 3-6, 3-7 and 3-8: The transmission line clearing drawings shown in Figures are not indicative of present accepted practice by UP&LCo. The clearing of the right-of-way is handled in the permit specifications and right-of-way is cleared by feathering, permitting low growth with rights-of-way, and avoiding skylines wherever possible. Structures appear to be relatively too close together on illustrations.

Response: Past experience indicates that the right-of-way clearing would be as pictured. This type of right-of-way clearing is shown as a "worst case" situation. Mitigation is described in Chapter 4.

(26) Comment: Page 3-94, Last Paragraph: This again refers to an increase in salinity of Rock Canyon Creek. See data submitted above under Attachment No. 7.

Response: Although the discharge from the drains has no measurable effects on Rock Canyon Creek, saline water is being discharged.

(27) Comment: Page 5-5, (c) Particulates: The estimates of particulates released given here are taken from table 3-1 on Page 3-10 and represent full load conditions not average conditions. Also in line 8 the word

"scrubber" is used, which should be electrostatic precipitator.

Response: The estimates were calculated on a "worst case" condition that could be expected to occur. The word scrubber has been deleted.

(28) Comment: Page 5-11, 2. Specific: Reference again to Rock Canyon Creek, see comments for Page 3-43 above and Attachment No. 7.

Response: See response to Comment No. (24), above.

(29) Comment: Page 6-5 Fifth Line from Top of Page: Now reads: "below levels that would acutely effect vegetation growth." We question use of the term "acutely." All tests that have been conducted and vegetation plot studies show no adverse effect on the vegetation at predicted concentrations.

Response: The analysis concerns a "worst case" situation. This worst case analysis has shown that vegetation would not be "acutely" affected but the chronic effects may be present. However, there is no evidence to substantiate this either way. This subject is dealt in greater detail in Vegetation, section F, in Chapter 3.

(30) Comment: Page 6-9 Item F Vegetation Third Paragraph: See above comment.

Response: The effects of a power plant operating for a time span of 35 years in the arid West has not been studied. See response to Comment No. (29), above.

(31) Comment: Page 6-11: Refer to report by Vaughn Hansen Associates entitled "Salinity Changes in the Colorado River from Development of Coal Fired Power Plants in Emery County, Utah".

Response: See response to Comment No. (23), above.

(32) Comment: Page 7-6 F Water Quality: Need to consider the dissolved solids that have been eliminated by the reduction of irrigation return flow from the agricultural land retired by the Company. This reduction in dissolved solids will make a major contribution to the improvement of the salinity in the Colorado River. See Vaughn Hansen Report cited above.

Response: See response to Comment No. (23), above.

(33) Comment: Page 8-48: Last Paragraph: First sentence now reads: "The Garfield East Site would receive coal from a drift driven about midway up the Straight Cliffs above the complex." It should read: "The Garfield East Site would receive coal from a drift driven in the base of the Straight Cliffs west of the plant site."

Response: The above sentence has been incorporated.

(34) Comment: Page 8-63 (5) Water Resources: It should be pointed out that the town of Escalante would be required by Utah State standards to meet primary or secondary sewage treatment regulations, thereby eliminating any untreated waste water discharges into the Escalante River.

Response: The State of Utah would require the town to meet sewage treatment regulations. However, the possibility of inadequately treated waste water entering the river would still exist.

(35) Comment: Page 8-102: First sentence reads: "Each unit will emit approximately 5.3 tons per day of ..." It should read "Both units together will emit approximately 5.3 tons per day using worst grade coal."

Response: The sentence has been corrected.

(36) Comment: Page 8-135 Last Paragraph, Second Sentence: Now reads "There is a low pressure drop across the system..." It should read: "There is a high pressure drop across the system..."

Response: The correction has been made in the text.

(37) Comment: Three corridors (Salina Canyon, Manti Top, and Spanish Fork Canyon) have been identified as viable for transmission routes for the Emery-Huntington vicinity to the Wasatch Front load area. Installation of two 345 kV transmission lines in each corridor would provide a total firm (loss of one circuit) transmission capacity of 3200 MW uncompensated or 4700 MW with series capacitors (assuming resonance problems between generators and series capacitors can be resolved). With the present and firmly planned generating units in this area, (Huntington 1 and 2 and Emery 1 and 2) generating a total of approximately 1600 MW and allowing 400 MW for importation on the Four Corners Line, three corridors when fully developed would permit an additional 1200-2700 MW of generating capability in that area (including possible wheeling of approximately 400 MW for IPP generation). Construction of 500 kV lines to reduce the total number of 345 kV lines would considerably reduce the reliability and firm transmission capacity.

Reference is made on Page 8-161 that Units 3 and 4 at both Huntington and Emery and associated transmission are likely needed by 1990. Additional units may or may not be required by 1990 in the Carbon-Emery area and Huntingon or Emery may or may not be the appropriate locations.

Discussion of the first modification to the Spanish Fork Canyon indicates that if a 345-138 kV connection were made to the Carbon 138 kV system the 138 kV lines in Spanish Fork Canyon could be eliminated. Only a portion of the 138 kV lines could be removed. The section from Diamond Fork to Spanish Fork would probably need to be retained for interconnection with the proposed Central Utah hydro generation units. The section from Carbon to Soldier Summit would probably be retained to supply existing and future loads along the segment which would exceed the capability of the 46 kV system. This modification would also increase the cost 8-10 million dollars.

The same comments about 138 kV line removal in Spanish Fork Canyon would apply to the second modification as discussed on Pages 8-163 and 8-164. The additional cost for this modification would be approximately 6 million dollars.

Response: The section was not changed as viable alternatives have been represented, in accordance with Part 1500.2 of the Council on Environmental Quality guidelines.

o. Claron E. Nelson, PH.D., University of Utah (Letter No. 15)

(1) Comment: The 1975 Annual Report of Utah Power & Light Company provides data which clearly indicates that the expansion is intended for export. The 1975 sales for resale were 2224 percent of 1970 sales for resale. Considering UP&L system sales to residential, commercial and industrial customers plus a growth for resale based upon the increases of the other components, the 1975 kWh generated exceeded the sales by 5 percent. Note that 1970 generation was approximately 86 percent of sales. Using the 1975 company ratio between electric capability and sales, the addition of the Huntington 2nd unit (scheduled for 1977) would provide for 39 percent expansion of demand within the UP&L marketing area. The actual sales increase from 1970 through 1975 was 45 percent for these customers classes. On page 1 - 115 of the DES, the company projects an almost identical normal load growth between 1975 and 1980.

Response: See Utah Division of Public Utilities letter, October 7, 1976, in response to BLM inquiry (Appendix I-7).

(2) Comment: The UP&L projection relates to another serious deficiency of the report. The Company assertion that there will be a specified increase is not a substitute for a demand study. There is no evidence in the DES that such a study has been made and inquiries to BLM personnel has provided no additional evidence.

Response: See Utah Division of Public Utilities letter, October 7, 1976 (Appendix I-7).

(3) Comment: It appears to me that the general welfare provision of NEPA imposes a responsibility on the resource management agencies to evaluate the local, regional and national effects of actions. The environmental impact statements should demonstrate that these factors have been adequately considered.

Response: See Utah Division of Public Utilities letter, October 7, 1976 (Appendix I-7). The Bureau of Land Management does not have the responsibility to analyze the need for power, but only to analyze environmental effects caused by production of that power, if national resource lands are involved.

p. Robert H. Shields, U.S. Department of the Interior, Fish and Wildlife Service (Letter No. 16)

(1) Comment: Chapter 3, page 46, 2nd paragraph. Brown trout are a species capable of maintaining adequate population levels under heavy fishing pressure. It is not expected that the German brown trout in these waters would be over-fished. Add: However, fishing would become more competitive and less rewarding to the fisherman.

Response: The statement has been added to Wildlife, section H, in Chapter 3.

(2) Comment: Chapter 3 page 47 Threatened and Endangered Species. Sighting of the American peregrine falcon, an endangered species, are too infrequent to form a basis for determining impacts resulting from the project. The peregrine falcon has highly specialized habitat requirements for successful reproduction. Historic eyries, though unused at present because of low population, are important to restoration of the species. The presence or absence of any known historic eyries should be noted.

Response: The only historic peregrine falcon eyries known are east of Provo, Utah, on the Wasatch Front. This has been noted in Wildlife, Part 8, in Chapter 2.

(3) Comment: Chapter 3, page 66, paragraph 3. Also, an additional 2,700 visitor days of big game hunting would be expected to increase the harvest of mule deer by 360 to 600 annually. Add: Most deer herds in Utah are already hunted to capacity. Therefore, 360-600 additional deer might not be available. In this case, the additional 2,700 man-days of hunting would be accommodated at the expense of lowered hunter success and more competitive hunting conditions.

Response: The statement in relation to the lowered hunter success has been added to Land Use, section H, in Chapter 3.

(4) Comment: Chapter 3, page 68, first full paragraph. The fracturing could dry up springs located above the mine which are now providing water for 500 head of cattle permitted to graze the area from June through September. The area cannot be grazed without water. Thus, approximately 2,900 AUM's of forage would be lost, representing a loss of beef production equivalent to an annual consumption of 550 persons. This would be a permanent impact since the springs could never be restored.

Impacts on wildlife from drying up of the springs should also be addressed in the wildlife section.

Response: Springs above the mine could be dried up as a result of subsidence. This would impact livestock grazing as the source of water would be lost. However, wildlife would not be adversely affected to the same degree as livestock because wildlife are much more mobile and could, therefore, obtain water from other areas. The effects of drying up springs on summer range used by elk as a result of subsidence is discussed in Chapter 3, Section H. Elk wintering in this area would not be affected

by the loss of these springs. The impacts of the springs drying up in relation to small mammals and passerine birds is discussed in the same section.

(5) Comment: Chapter 8, page 28 (6) Wildlife: The Escalante River from Calf Creek to Lake Powell does not provide suitable habitat for aquatic wildlife because of the wide fluctuations in flow and the high level of suspended sediment (Iorna, 1968: USDI, 1976). The proposed reservoir would be located half way between Calf Creek and Lake Powell.

The above statement is not correct. Suggest it be revised to read: The Escalante River from Calf Creek to Lake Powell fluctuates widely and contains few game fish. However, ten species of fish, primarily suckers, chubs, shiners and dace, occur in this stream segment. Frogs and other amphibians also exist in the streamside habitat.

The comparatively lush vegetation of the canyon bottom supports good populations of small mammals. This, together with abundant cliff nesting sites in the canyon walls, makes the Escalante River important habitat for eagles and other raptors.

Fifty Mile Mountain south of the Garfield plant sites has been designated as a potential area for reintroduction of desert bighorn by the Utah State Division of Wildlife.

We realize that discussion of wildlife in the alternative sites is largely academic since the plant is already under construction. However, to set the record straight for any other proposals that may be made in the future for this site, it should be made clear that the Escalante River is not barren of aquatic life.

Response: This information has been added to the Garfield Alternative section in Chapter 8, Part 2.

(6) Comment: Chapter 8, Page 182: To date, success of the drive toward household and industrial conservation is random and individualized. There is no indication that these measures would be implemented in UP&L's market area to such a degree that further power development not be planned.

Suggest addition of a sentence: Development of additional power by the project would make initiation of needed energy conservation measures even more difficult and less likely by removing the incentive, thus setting up a vicious cycle that would perpetuate the ever increasing demand trend.

Response: The suggested sentence was not added to the statement. Even with conservation measures, there would still be a growth rate of energy consumption of at least 1 to 2 percent per annum because of labor-saving devices. See Ford Foundation Study Report, December, 1974; A Time To Choose; America's Energy Future.

q. Peter Hovingh (Letter No. 17)

(1) Comment: I have heard that some of the ranchers in southwesten Utah complain about a more and more recurring event, possibly associated

with the steam from power plants. During the winter the steam condenses on the vegetation and freezes. This prevents the cattle from foraging (along with the wildlife). This problem I could not find addressed to in the ES.

Response: This subject is discussed in the steam plume portion of Air Quality, section C, in Chapter 3. Frost could occur to 0.5 mile from the cooling towers, but this would be a highly unusual situation. As described in Chapter 2, the area around the cooling tower consists of agricultural land, not utilized for grazing. If this event did occur, it would be limited to a small area downwind from the plant and would not adversely affect livestock or wildlife forage.

(2) Comment: There has been many reference to Off-Road vehicle activity and the predicted increase by 12 % because of the power plant. Yet the mining activity associated with the power plant is but a fraction of the total projected mining activity (Table 2-18) (600 for Emery out of 4676 total new employees to the two county area. Using the data in Table 2-18, one could anticipate a 96% increase in the off-road vehicle use due to the total mining activity. Yet reference to overcrowding in the recreation sites (Table 2-12) indicates disaster will strike such scenic areas as the San Rafael (or the Escalante, if that alternative is selected). In mitigating the problems associated with the power plant, no mention is made to mitigate this extensive overuse of a highly fragile region as the San Rafael. Most of the San Rafael is under the BLM jurisdiction. Will there be more campgrounds? Will there be prohibitions of ORV in the region?

Will there be an increase in law-enforcing agents (federal) and naturalists to guard the public lands from rape? Will there be the proposed primitive areas established? I think that it is time that the BLM begins to pull personnel off from energy development and balance the show by putting more on to protection of public lands.

Response: Due to present funding and manpower restrictions, off-road vehicle (ORV) and recreational use on the San Rafael Swell cannot be adequately mitigated at the present time. Therefore, these adverse affects are discussed in Section E, Soils, Section F, Vegetation, and Section C, Water Resources, in Chapter 5.

(3) Comment: On page 3-41, it is mentioned that "the salt would not impact game fisheries since none exist downstream from these towns". I am very interested in the non-game fishes that exist in the San Rafael River and tributaries, and likewise in the Escalante River should that alternative be selected. Will the salt affect the non-game fishes?

Response: Suckers, chubs, shiners, and dace are found in the San Rafael drainage and its tributaries and in the Escalante drainage. Because of the existing total dissolved solids content in the tributaries of the San Rafael, slight salt increases would not affect these nongame fish. There are a number of locations where these same fish exist in waters that contain a higher amount of total dissolved solids than that expected in streams affected by the power plant.

(4) Comment: In discussing the Garfield sites as alternatives, perhaps not enough mention has been made of the National importance to many people that the Escalante River drainage is in. There is no mention, for instance, of how many people who now hike the Escalante River from the highway down to Coyote Creek, could hike that section with a reservoir in it. Although the loss of riparian habitat would represent less than 10 percent of the total habitat in the Escalante River drainage (Page 8-40, 41), certainly a far greater loss of riparian habitat would occur to PRESENT recreation backpackers and survival training groups. In short, the Garfield sites are not alternatives and UP &L would probably agree, but for a different reason (It is considered to be a site in its own right).

Response: Accurate figures concerning the number of visitors currently using the Escalante River Canyon are unavailable, since the main canyon can be entered from many side drainages. Current BLM estimates indicate the main canyon could sustain additional usage. The riparian habitat is not now being damaged. However, were the dam to be built, the riparian habitat would be inundated.

(5) Comment: In several places there is mention of the median family income in the various counties and all the counties listed have a median income below the state average. Several other lines of statistics have the percent of population below the poverty level are usually listed also. One should mention that these are rural populations and rural populations usually have a median family income below the urban average. However, the net-worth of a family in a rural area may well be much more than the net-worth of a family in the urban setting. The rancher has a heavy investment in land, machines, and livestocks. The urban dweller has no heavy investments. Income averages are quite misleading and so are percent of unemployment and percent of population below the poverty level. The cost of living in rural areas is usually lower than urban areas. The state averages are high since most of the people of Utah live in Urban areas.

Response: The new employees and their families would live in existing communities causing the area to change from rural to urban. The impacts to human resources were assessed, therefore, on an urban rather than a rural basis.

(6) Comment: There is mention of solar and wind energy (8-174, 176), and the description accompanying them is perhaps misleading and perhaps come from either Washington or UP &L. There is only mention of the far-out facets of solar and wind that only business could provide (and the energy mining companies and States that depend on energy mining company royalties would fight until all the energy is mined out of the earth). Presently there is technology to heat by solar energy and provide limited electricity by wind. Such small business is not encouraged by the powers that be. It seems that UP &L and Washington want us to heat our water twice - once at the plant site (up to 1,000 F) and again on the kitchen range (212 F).

in the draft statement of whether those projects listed will actually be impacted. If it is impractical to include larger scale maps, then the draft should at least list those recreation areas within the zone of visual or actual influence as well as discuss the impacts on those areas.

Response: The impacts to parks and recreational areas from the transmission lines were analyzed. The transmission lines would not impact any park or recreational area. See Land Use, Part 11, Chapter II.

(2) Comment: We note that alternatives of Garfield East and West could deplete 10,000 acre-feet per year of Escalante River water. The Escalante River is included under Section 5(d) of Public Law 90-542. This section requires that in "all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national, wild, scenic and recreational river areas...." The final statement should recognize the free-flowing potentials of the Escalante River and indicate that it is included under Section 5(d) of Public Law 90-542.

Response: The proposed wilderness status of the Escalante River is recognized in the Garfield alternatives, Part 2, in Chapter 8. It is stated that the area will be managed as wilderness until the United States Congress determines its status.

t. Ralph C. Cisco, United States Department of Agriculture, U.S. Forest Service (Fishlake) (Letter No. 20)

(1) Comment: Page 1-83, Table 1-11. Helicopters will be necessary for erection of towers and stringing conductors and should be added to the table.

Response: Table 1-11 has been changed to show use of helicopters.

(2) Comment: Page 1-85, Item (11). As we stated in our previous comments we do not feel reseeding is sufficient. We believe you should use the term "revegetate" instead of "reseeding."

Response: The term "revegetate" has been inserted in place of "reseeding."

(3) Comment: Page 2-115, Figure II-3-5. The area from mile post 40-44 is a prime elk winter range. In chapter 4 you recommend closing this area to construction activities during the winter months. E-W should be added to the wildlife listing. Brown's Hole is also a prime Elk calving area. E-S should be added for mile post 47-53. This is also identified in chapter 4.

Response: The elk winter range is indicated in Appendix VI-5. The elk calving area at Brown's Hole is now shown in Figure 2-18.

Response; Solar energy is presently being used only on a small-scale basis, usually as a means for supplying supplemental heat to individual homes. Under the present state-of-the-art, large demands for electricity generated by solar or wind energy cannot be fulfilled. A recent study (University of Oklahoma, 1975) contains a more complete analysis of solar energy. The utility companies base charges on three types of costs: Customer cost, which is the charge for reading the meter; demand cost, which is the charge for generating electricity; and energy cost, which is the price for generating power. The cost to a consumer is the sum of all three costs. The power bill consists of approximately 60 percent customer and demand costs. These costs would be charged to the customer regardless of how much electricity is used. If a customer used a solar assist system to provide electricity for space or hot water heating, he would still pay for the customer and demand portions of his power bill. In addition, the spinning power reserves would have to be available to provide power during days the weather would not permit the use of solar energy.

(7) Comment: There is one complaint I have in the draft EIS. Your map as the one on page 2-55 shows the area of concern. The Emery site is almost off the map. Perhaps there would be more concern with the San Rafael region if that were also included on the above such maps.

Response: The major concern of the San Rafael Swell is recreational (as reflected in the Recreation section under Land Use in Chapter 2). Wildlife is not a major feature of the area. The primary influence zone map (Land Use, Part 11, Chapter 2), accurately reflects the area affected by recreational uses.

r. Patricia S. Dixon, Sunset Neighborhood Committee (Letter No. 18)

(1) Comment: Environmental impact; just what impact is a powerline of that magnitude going to cause in a high residential area; Just what impact is a powerline of that magnitude going to cause to school children (who will spend hours and months and years in its shadow, i.e., Sunset Elementary School; Just what impact will be borne by the people? What socio-economic problems and concerns do the people have-and gentlemen I emphasize the PEOPLE. Have we become so advanced civilly and technically when we forget the very basic unit of our society?

Response: The effects of the transmission line in the Provo area have been added to Human Resources and Human Health and Safety, sections in Chapters 1 through 7.

s. Robert J. Arkins, U.S. Department of Interior, Bureau of Outdoor Recreation (Letter No. 19)

(1) Comment: In the above-mentioned letter, we identified those parks and recreation areas which could potentially be impacted by the transmission lines associated with the project. We are unable to find any determination

(4) Comment: Page 4-7, Item 12, In our previous comments we suggested that this requirement be placed on "some structures" not all structures. The existing line in this area does not have painted towers. In your response of August 19, 1976, you assured us that the wording would be changed. Once again we recommend the wording be: "Prior to construction and coloring of some structures............... .....natural landscape.

Response: Text now reads: "Prior to construction, a landscape architect would be consulted to select colors and to blend structures with that of the natural landscape."

(5) Comment: Page 4-7, Item 13. This item implies that every structure must be screened from site of highways. This is impractical and you identified it as an adverse impact in chapter 5. We suggest you rewrite this to reflect the realistic point of view and make it a requirement to attempt to screen all towers rather than a must.

Response: The change has been made in Chapter 4, Mitigating Measures No. 14, beginning, "Where possible...."

(6) Comment: Page 4-10, Item 2., E. On the existing line from the Huntington Plant it has been necessary to remove trees of less than 35 foot height to obtain line clearance. We recommend that this statement be changed to read "only vegetation within 20 feet of the conductors would be cleared from the right-of-way along the transmission line corridors, or as necessary for road construction.

Response: The change has been made.

u. Virginia J. Sorensen, Emery Town Clerk (Letter No. 21)

(1) Comment: In my opinion, the 'Pollution Control' devices are entirely inadequate.

On August 12, 1976 an article in the Emery County Progress mentioned, in the closing paragraph, some of the possible deleterious effects so I contacted the Editor by telephone.

Mr. Haddoc informed me that the 'high quality coal which will be mined will not create those problems.' As a life-time resident of Emery Town I beg to differ with this statement. During my childhood and during the years I have lived here in my own home I have learned that this 'high quality' coal from the Consolidation Mine creates considerable smoke. Any person who has had experience with coal ranges and coal heating stoves can corroborate this.

Response: The particulate control devices would remove 99.5 percent of all particulate emissions which would otherwise be discharged from the stack. This would make the particulate emission minimal far below the 10 percent of that contributed to the atmosphere by soil dust. The SO_2 control equipment discussed in Chapter 8, Section C, Alternative Plant Design and Operating Methods, would remove 80 to 90 percent of the SO_2 emissions. If UP&L were required to install this equipment, the SO_2

impact on the environment would be undetectable to human senses and below levels that would affect vegetation or animals.

v. Mrs. Joel Murphy (Letter No. 22)

Comment: On Page 8-161. Long-term plans indicate that in addition to the lines indicated above, there will be a need for the following 345-kV lines through this corridor:

*Wheeling Power for ICPA from IPP station
*Units 3 and 4 at Huntington
*Units 3 and 4 at Emery

With current electrical projections it is likely that these additional lines would be needed by 1990. These three additional lines could be converted into a 500-kV line, and run parallel to the 345-kV line from the Carbon plant to Camp Williams.

I asked this question of the Mayor, Russell Grange, and I also asked in a public meeting this question to UP & L officials, and was told that they are not planning to add additional structures. They also stated they did not write the impact study, so what I asked about on page 8-161 was incorrect. In my opinion this is an untruth. Surely U P & L officials gave this information to the Bureau so they could publish it. . . .

Isn't there someone, somewhere who can help us? The indications are that this power isn't going to be for this area for another ten years, when they build their substation in Orem. Are we being the scapegoat for northern Utah's power?

Please find out about this second 500-kV line if you can. If this is going to be the case, I want to know! My housing development where I live would certainly be ruined, and I would probably never get fair market value out of my home if I have to sell.

Response: The UP&L has indicated that if they wheel power for the Intermountain Power Project the 345-kV lines would pass over Hogan Pass and enter the Page to Sigurd corridor at a substation near Koosharem, Utah.

A 345-kV line would transmit approximately 780 MW, while a 500-kV line would transmit 1,660 MW. Therefore, a 500-kV line could not replace three 345-kV lines.

Because UP&L has identified some 23 areas for power plant sites (see Introduction to Chapter 8) it is difficult to determine what transmission corridors would be utilizied in the future. Section has been deleted.

w. Robert H. Hassell (Letter No. 23)

(1) Comment: I find your analysis of the interation of airborn pollution between the Huntington and Emery plants (pages 6-5 and 6-6) somewhat unbelievable. Your analysis concluded that there would be no interation between pollutants from these two plants, even though they are only fifteen miles apart. With visible pollution from the Navajo Plant reaching nearly to the Waterpocket Fold, with infrared photography

finding Four Corners pollution at Bryce Canyon, and with Mojave pollution showing up frequently at Cedar Breaks, I find your analysis to have an Alice-In-Wonderland quality. I do not believe your conclusions can be substantiated, and the EIS makes no attempt at doing so. It would be nice to have some maps showing ppm concentrations of SO_2 and NO_x from both Huntington and Emery along the circumferences of concentric circles whose centers are at the plant locations. Several maps with predictions of pollutant concentrations under different dispersal conditions should be included.

Response: A study recently completed by the H.E. Cramer Company further defines interactions between the Emery and Huntington plants. The analysis includes isopleth maps illustrating the predicted concentrations of SO_2, NO_2, and particulates for the two plants (see Chapter 6, Section C, Air).

(2) Comment: One thing that continually bothers me about most EIS volumes is that while they do nicely in projecting monetary benefits from the proposals, they fall woefully short on analysing costs. This EIS is a large improvement over the Kaiparowits EIS in this area, and I appreciate your efforts particularly with regard to impacts on schools. However, you still have a long way to go to reach adequate. What, for example, will be the costs to the public of the necessary road construction for the highways related to the project? U-10 is simply not built for heavy construction, and it would be interesting to know how much the accelerated deterioration of this road will cost the taxpayers of Utah. How much will the new water and sewer facilities cost the taxpayers in Emery County? Huntington's problems seem to show that the cooperation of UP&L with local government has not been ideal, and we seem far from finding a satisfactory solution to financing these improvements. How long will it be before tax revenues from these projects begin to balance costs, if in fact they ever do? Your EIS makes no attempt to answer these questions and as such is not adequate in its appraisal of impacts in this area.

Response: According to the Utah Department of Transportation the area highways are adequate, and will carry the construction loads without any undue damage. Thus, no new road construction or road taxation are anticapated. The sewer and water impacts that would result from the Emery project, have not been isolated from additional energy development in Carbon and Emery counties. The Castle Valley Improvement District will charge 14 mills on all private land in Emery County to provide for community improvements. Carbon County has no improvement district. The tax money will lag several years behind the impacts, and when the plant is taxed, all funds would be paid to Emery County.

Several mitigating measures are currently underway, (Chapter 2). However, additional impacts would still occur. The ES does not appraise methods of overcoming these impacts since such mitigation would be the responsibility of state and local governments. To date, the local governments have not indicated firm and committed mitigations to additional socioeconomic impacts. (The mill levy is discussed in Chapter 2, Section M, Human Resources).

(3) Comment: I really am wondering why we see no consideration of other sites in Carbon and Emery Counties. What seems to be the case here is that the EIS considers only the alternatives proposed by UP&L.

Response: The Emery plant and additional Huntington units have been analyzed. Other sites in Carbon and Emery counties were analyzed in an early study and rejected for reasons shown in Chapter 8, Section B, Alternative Sites for Coal-Fired, Steam-Electric Generating Plants. The socioeconomics impacts in Carbon and Emery County would remain the same regardless of the site selected. Also see Appendix I-2, Enclosure to letter from UP&L to BLM, October 14, 1975, (site selection process).

(4) Comment: The energy conservation alternative should not be dismissed because no one forces us to conserve. We know we can do it if we have to, and maybe there will have to be an actual threat of shortage before we make any moves in that direction. Your EIS should include an analysis of how much energy we could actually save in Utah by energy conservation measures. Remember that the power from Emery is not to meet current needs, only future demands, and so we are not discussing rebuilding Salt Lake City.

Response: See response to Comment No. (6) Letter 17.

x. Alvin E. Rickers, State of Utah, Division of Health, Bureau of Air Quality (Letter No. 24)

(1) Comment: Page 1-17 location 2c. Bureau of Environmental Health should read: "Environmental Health Services Branch."

(2) Comment: Page 1-25, 2nd paragraph, under 5. The Utah State Division of Environmental Health should read: "The Utah State Division of Health, Environmental Health Services Branch."

Response: Appropriate changes have been made.

(3) Comment: It is now (September 20, 1976) (both the Senate and the House have approved separate versions) very doubtful that Congress will approve the Clean Air Act Amendments before adjournment in early October, 1976. These amendments, which include the Prevention of Significant Deterioration provisions, are likely "dead." If so, the EPA's regulations apply and the Class II designations remain valid.

Response: Utah Power and Light Company is currently petitioning in court for a review of their applicability to the Class II PSDR. The BLM has been informed by UP&L that their proposal is still without scrubbers. However, Chapter 8, Table 8-25, reflects the control necessary to meet the Class II SO_2 increments. For more discussion on this subject see Chapter 8, Section C, Alternative Plant Design and Operating Methods.

(4) Comment: The SO_x emissions (as SO_2) are shown as 90 TPD, which is

the predicted uncontrolled emission. Our approval of plans for this project requires 80 % SO_2 removal. On April 15, 1976, UP&L awarded an order to Chemico Air Pollution Co. for a sulfur scrubber, specified to remove 80 % of the SO_2 from the emission.

Response: See response to previous Comment No. (3).

(5) Comment: An additional footnote might logically be included to note that a regulation requiring 80 % removal of SO_2 was in effect at the time the Executive Secretary, Utah Air Conservation Committee, gave approval for construction of the Emery Power Plant.

Response: The table was based upon information in a letter from the former Director of the Bureau of Air Quality, April 1, 1976, stating: "At this time, flue gas desulfurization units (scrubbers) are not required for the Utah Power Company's Huntington #1 and Emery #1 and #2 coal-fired steam electical generator" (Appendix I-4). The footnote was therefore not added. See response to Comment No. (3) above.

(6) Comment: Change "Committed Emission Control by Applicant" to 80 %, rather than "0" as shown. On April 15, 1976 UP&L awarded an order for a sulfur scrubber for the Emery No. 1 Plant to Chemico Air Pollution Company, specifying an 80 % removal efficiency for SO_2.

Response: See response to Comment No. (3) above.

(7) Comment: It may be in error to estimate that concentrations of photochemical oxidants (measured as ozone) will be low. Monitoring performed on other relatively undeveloped and sparsely populated areas of Utah indicates that background ozone concentrations have exceeded the National Ambient Standards.

Response: The statement has been changed.

(8) Comment: Following the words "boiler temperatures," add the words "and firing methods."

Response: The appropriate change has been made.

(9) Comment: Receptacle is an inappropriate word in its usual sense.

Response: The word "receptacle" has been changed to "receptor."

(10) Comment: At end of second line following the word "project," add the words "unless improved technology is later retrofitted."

Response: This phrase does not apply to Chapter 7. Alternatives to emmission control equipment is discussed in Chapter 8, Section C, Alternative Plant Design and Operating Methods.

(11) Comment: Since UP&L is now committed to purchase a sulfur scrubber for the Emery No. 1 Plant, the alternative is now a reality and should

be reported elsewhere when the Final Environmental Statement is prepared. There is some inconsistency with fact in the past actions. The correct information is provided and should follow the sentence: "The approved design included a commitment to remove 80 % of the SO_2." The Utah regulation requiring 80% removal of SO_2 was later rescinded and after due consideration, the Utah Air Conservation Committee determined that the State would not now require the use of flue gas desulfurization units for the Numbers 1 and 2 units at the UP&L Huntington and Emery Plants. However, although the authority to modify the plan approval (as approved December 12, 1973) has been given to the Executive Secretary, Utah Air Conservation Committee, the Utah Power and Light Company has not submitted the necessary request, plans, and specifications; consequently, the proposal as previously approved is still in effect.

Response: See response to Comment No. (3) above.

(12) Comment: The 80 % control of sulfur emissions is not a Prevention of Significant Deterioration Regulations requirement, rather, it was a requirement imposed by a State regulations which was in effect until July 10, 1975. The State's approval of the proposed construction was given December 12, 1973. Because the PSDR was not promulgated until December 5, 1974, the Emery Plant as approved by the State was considered to be an existing facility under PSDR; however, if the plan approval were modified, the facility would be regarded by the Environmental Protection Agency as a modified source (modified after the effective date of the PSDR) and would be subject to PSDR.

Response: This section has been changed to more accurately describe how flue gas desulfurization for the Emery Plant applies under the PSDR.

y. Jack L. Beckner, Peabody Coal Company (Letter No. 25)

(1) Comment: The Emery Environmental Statement addresses subsidence and the results of subsidence, should it occur, in the following places: Page 2-29, Chapter 2, Part B. Page 3-30, Chapter 3, Part D. Page 3-44, Part G, Section 2. Page 3-68, Part L. Section 2.a. Page 3-68, Section 2.b. Page 3-90, Part N, Section 2. Page 4-11, Chapter 4, Part E, Section 2. Page 4-12, Section 3. In addition to the discussions of subsidence listed above, the Statement also mentions it in the summary-type Chapters 5, 6 and 7. In view of the circumstances of mining at Wilberg, it does not appear that subsidence will actually manifest significant surface effects. When an underground opening is established, the original equilibrium is disturbed with resultant stress concentrations. While many factors are involved in opening stability, the span, or width of opening, is undoubtedly one of the most important factors in failure. Assuming it is relatively small, the overlying rock strata can bridge across the opening and little, if any, movement or convergence of top and bottom will occur. However, as the span increases, a point is reached where the stress in the overlying rock strata exceeds the strength value of the rock, and the top breaks. If the opening span is limited to a subcritical value and/or is at great depth, as at Wilberg Mine, a

pseudo-arch will form, achieving stability before rupture occurs at the surface. The boundary of this arch is thought to approximate an ellipse in form with the long axis vertical and equal to four times the width of the opening. In Great Britain, the National Coal Board had measurements made over 157 coal mines from 100 to 2,600 feet deep, with seams ranging in thickness from 2 to 18 feet and inclines up to 25 degrees. Opening widths varied from 100 to 1,500 feet and width/depth ratios from 0.05 to 4.0. It was apparent that as long as the width/depth ratio is less than 0.25, subsidence (and inferentially surface damage) is negligible.

Response: Subsidence is considered as a potentially significant factor. Data are presently unavailable to predict whether or not subsidence would occur or affect underground aquifers.

(2) Comment: Page 3-49, Chapter 3, Part H, WILDLIFE. Terrestrial Wildlife. Peabody experience indicates that deer are not adversely impacted by the noise and activity of coal mining. Such animals have been observed to approach and cross active mining areas. Evidence of deer on freshly graded areas and highwall sides of surface mines indicate approaches to within a few hundred feet of active mining areas. At Wilberg, the portal area is on steep terrain not readily traversed by deer. The steepness of the canyon walls will provide a natural barrier to propogation of noise and thereby also reduce the effect of mine operation on wildlife. The conveyor belt is designed as an above-the-ground-structure, supported by towers. Thus, deer, elk and other wildlife will experience no difficulty in crossing the converyor belt right-of-way, and the affect on deer from the conveyor belt will be minimized.

Response: Information from the Utah Division of Wildlife Resources indicates that although deer will migrate through a coal mining area, they will no longer use the area as habitat for fawning.

(3) Comment: Page 3-78, Chapter 3, Part M, HUMAN RESOURCES. According to the 1974 United Mine Worker's Association Contract, the average income for mine employees is $14,209.00 per year. The projected income appearing on page 3-78 in Table 3-15 of $12,500.00 is too low.

Response: The new income figure has been included in Table 3-15.

(4) Comment: FEDERAL AGENCIES. "...No dozer, blade, or ripper-equipped track vehicles would be allowed..."

Peabody proposes to use track dozers or ripper-equipped vehicles for use in construction of the pipelines and coal conveyor belt.

Response: The statement has been changed to read, "Dozer-blade, or ripper-equipped track vehicles would not be allowed except for road, pipe line, and coal conveyor construction," see Chapter 8, Section B, Measures Required of the Applicant by Federal Agencies.

(5) Comment: Page 4-4. "Prohibit vehicle travel during the spring thaw and runoff..." We need some clarification of this mitigating measure. Access to the mine and all parts of the complex is necessary

during all kinds of weather. Continuous access is necessary to realize maximum efficiency of mine production.

Response: The statement was used in relation to construction activity. The statement has been changed to read "Prohibit vechicle travel, for engineering and construction purposes, during the spring thaw and runoff." See Chapter 4, Section B, Measures Required of the Applicant by Federal Government.

(6) Comment: The use of 84 million tons of coal over the lifespan of Emery Station is a utilization of the coal as opposed to a loss of the coal. The potential loss of coal remaining in the ground which is not mineable by economical methods may further be reduced by development of mining methods and improved techniques within the lifespan of Emery Station. The Statement indicates that 147 million tons of coal will be lost if the project is authorized. The amount of coal actually lost should be reported only as coal left in place in the mine after mining 84 million tons. The amount left in place will depend upon the per cent recovery achieved over the life of the mine.

Response: The text has been changed to reflect that only 50 percent of the coal is recoverable, under present mining techniques. The remaining coal "in place" presently cannot be mined. Therefore, over the life of the project, 168 million tons would be irretriveably lost and unavailable for use by man. The 84 million tons has been based on the maximum long term operating rate of 80 percent, see Chapter 1, Part 5, Coal Source.

z. George D. McMillan, United States Department of Agriculture, Soil Conservation Service (Letter No. 26)

(1) Comment: The discussion on soils is generally adequate, except that the suitability and limitations of the soils for the installation of the generating facility roads and the coal conveyor are not discussed as they would affect the structural stability of the measures to be installed.

Response: The participants have evaluated soil stability where the conveyor belt, plant site, and facility roads would be located and found the soils to be suitable. Therefore, as no impacts have been identified, this aspect of soils was not discussed.

(2) Comment: There is very little discussion of the effects of disruption of the natural drainage pattern by construction of the works of improvement to be installed so that adjacent lands are not flooded or otherwise restricted in use.

Response: Except as discussed under the subject of subsidence, the project as proposed would not change or disrupt any surface drainage patterns.

(3) Comment: There is adequate discussion regarding the cropland area

that will be eliminated and of the effects of reduced agricultural production, but there is no indication of how many acres of prime agricultural land will be lost either through actual construction on those lands or by depriving them of water. Also the EIS should make clear that existing conservation systems are to be protected and kept functional. There should be some discussion of the effects of the transmission lines and haul roads crossing irrigated land. These features could cause a severe handicap to improving the irrigation systems such as the installation of sprinkler irrigation lines. Wherever possible, alternative routes should be considered that would protect at least the prime agricultural lands.

Response: At present, irrigation is by flood, row, and furrow. The construction of transmission lines would not interfere with this method or with sprinkler irrigation systems should such systems be employed. The loss of agricultural land through actual construction or by diversion of water is discussed in Chapter 3, Section L, Land Use.

(4) Comment: The low annual precipitaton and poor soils on the low elevation rangeland areas makes successful reseeding of disturbed areas almost impossible. On these areas, a better method of re-establishing vegetation would be to stockpile the topsoil with the native plants included and spreading this topsoil on the disturbed areas. This method will probably result in much faster rehabilitation than if subsoil is left exposed and attempts are made to revegetate these raw sites.

Response: The stockpiling of topsoil would be ideal. However, in this Mancos Shale area there is not enough topsoil material available to stockpile for effective revegetation.

(5) Comment: The document states that deer numbers are currently down and then states that surrounding areas could not support additional numbers because the winter range is at carrying capacity. There does not appear to be any documentation or reference to actual productivity of the area.

Response: Documentation on actual productivity appears in the Terrestrial Wildlife, Part 7, of Chapter 2 and Wildlife, Section H, Chapter 3.

(6) Comment: The pipeline described on page 1-75 is cement-lined, coated and wrapped steel pipe. The actual pipeline being installed is fiberglass rather than steel.

Response: The change has been made.

(7) Comment: The Rochester Pictograph described in page 2-62 should read "Rochester-Muddy Creek Petroglyphs and are located 2-1/2 miles east of the town of Emery," instead of 5 miles east of the generating site as described.

Response: The appropriate changes have been made, see Chapter 2, Part 8, Cultural and Paleontological Resources.

(8) Comment: Page 2-69 indicates sand and gravel are abundant in the area of the generating facility, while page 1-90 indicates that sand and gravel will be obtained from commercial sources near Camp Williams. It should be made clearer where the source of sand and gravel will be for the generating plant itself and if the source is different for the transmission line that should be stated also.

Response: Sand and gravel as indicated in Chapter 2, Part 10, Minerals, relate to a description of the present environment. The source of sand and gravel in Chapter 1 reflects the Company desire to purchase sand and gravel to meet concrete-mixing specifications.

(9) Comment: There is no mention made of noise pollution from trucks or the conveyor system during plant operation, or from exhaust smoke, noise and dust during construction.

Response: Analyses of noise (Chapter 3, Human Health and Safety) dust and exhaust pollution (Chapter 3, Air Quality) have been included.

(10) Comment: The term erosive is used thoughout the report regarding the susceptibility of soils to erosion. A better term would be erodable.

Response: The term has been changed to "erodible."

(11) Comment: The information in the draft relating to schools, doctors, sewage treatment, etc, is out of date.

Response: Data used was from 1974 and updated in the early summer of 1976 through contact with hospitals, school districts, water associations and the multi-county district organization.

aa. Charles Custard, Department of Health, Education, and Welfare, Office of the Secretary (Letter No. 27)

(1) Comment: While attention is properly drawn to the possible interrelationships of a series of generating complexes in the Four Corners Region, we suggest that impacts upon water quality, water supply, and water diversion are characteristic of a number of projects in addition to the Huntington Project. We suggest that Table 1-2, p. 1-19, may merit reconsideration and amendment.

Response: The table deals only with interrelated coal-fired generating complexes. Impacts upon water quality, water supply, and water diversions may be characteristic of a number of projects, however, such impacts are not interrelated with the Emery complex. Impacts to local projects and quality of downstream flows are discussed in Chapter 3, Section G, Water Resources. Material in Chapter 1 pertains only to proposal description.

(2) Comment: Attention is directed to the expanded demands upon water, sewage, health facilities, and social service systems in the several communities at risk. However, there is no discussion of the mitigative

measures to be undertaken by State or local governments or by the utility to cope with the increased demand insofar as the Colorado River is concerned.

Response: No mitigative measures would be required since water use involves a change of use of water allocated prior to the Colorado River compact, not a new or increased appropriation. Except as discussed in Chapter 3, Section G, Water Resources, no other measures are known that would cope with impacts upon the Colorado River. No impacts have yet been identified.

(3) Comment: The problem of insufficient housing is identified, but no plan is outlined to cope with the projected housing shortage beyond the natural play of supply and demand.

Response: Council on Environmental Quality guidelines indicate that a discussion of unavoidable adverse impacts should include how the impacts will be mitigated (not how they might be). At the present time there are no real or committed mitigative measures from state, local, or private organizations to cope by law with the projected housing shortage.

(4) Comment: Generally, the consideration of water pollution is limited to saline pollution. There should be data provided establishing the basis for a finding that no other type of pollution will occur - if this is in fact the consensus of opinion.

Response: Utah Department of Health regulations and monitoring system were designed to prevent pollution of surface and ground waters by domestic waste. If such regulations are observed, pollution of these water sources would not occur. However, UP&L is monitoring, on a weekly basis, water quality above and below the drain discharges into Rock Canyon Creek. A coal-fired power plant has no water discharge. Chapter 3, Section G, Water Resources, discusses other water related impacts.

(5) Comment: Referring to the discussion of air quality, pp 3-9, we are not persuaded that the fact that the project was undertaken before enactment of the EPA standards (40 CFR 52) in any way reduces the de facto desirability of installation of emission control equipment at the Emery Plant.

Response: The proposal submitted by UP&L was analyzed on the basis that it complied with enforceable regulations. The controversy with EPA over application of PSDR is the subject of litigation filed by UP&L in the U.S. Circuit Court of Appeals for the District of Columbia. A discussion of alternative use of flue gas desulfurization equipment has been added to Chapter 8, Section C, Alternative Plant Design and Proposed Action.

(6) Comment: Since there is likelihood that there will be a release of trace elements, including radioactive elements, it would be desirable for the utility to underwrite a continuing monitoring program on release of elements and their impact on plant and animal life in the area.

Response: Utah Power and Light has plans for the sampling of soils and vegetaion around the plant for trace elements. There are no plans at present to sample for radioactive elements. (See Monitoring Program Part 12, in Chapter 1.)

bb. Jan Johnson, Utah Environment Center (Letter No. 28)

(1) Comment: Furthermore, this issue takes on greater importance as UP&L took it upon itself to begin construction of the Emery unit (an act that negates the relevance of alternative site proposals). They cite commencement date of construction (4/29/75) as reason for not installing SO_2 scrubbers. We find this an inexcusable and a coercive and covert attempt to buck the 40 CFR 52.21 provisions that went into effect scarcely one month later (6/1/75). The question remains if a different site would have been selected would construction have begun prior to 6/1/75? We think not.

Response: Utah Power and Light is petitioning in the Circuit Court of Appeals against the EPA determination that the Emery plant would indeed be subject to the PSDR and to regulations (40 CFR 52.21) which would require use of scrubbers. The air quality regulations would have applied equally to all alternative sites. Some sites would have had more and some less of an impact on air quality. The site selection process is discussed in Appendix I-2 and in the introcution to Chapter 8. It is only conjecture when construction would have begun at these other sites. (See response to Comment No. (5) Letter 27.

(2) Comment: We feel that elimination of SO_2 scrubbers from original plans is a significant alternation of the original proposal, since it will increase SO_2 emissions by at least 80 %. UP&L has proposed to put scrubbers on the Huntington Power Plant Second Unit--why not Emery? We also feel that UP&L's desire to eliminate SO_2 scrubbers from the Emery complex would work against the goals and policies of the Clean Air Act and its non-degradation clause, due to the proximity of the Emery unit and the national forests on the Wasatch Plateau.

Response: The alternative of using scrubbers has been discussed in detail in Chapter 8, Section C, Alternative Plant Design and Operating Methods. As mentioned in reply to earlier comments, UP&L is requesting a legal decision on the applicability of the regulations that would require them to install scrubbers. (See response to Comment No. (5) Letter 27.

(3) Comment: Transmission lines - We are aware of the opinion that there is a great need for further review and study of the impacts (socio-economic, welfare, health, ecological) that would result from having 345 kV transmission lines through densely populated areas of Utah County. Public opinion received at the hearing held by the BLM in Provo on 9/9/76 seems to substantiate our position.

The DES is not correct in detailing the exact route of the transmission lines as it appears UP&L has changed the routing from those

plans stated in the DES. We would like to know where the transmission lines are now being placed, and what criteria will be used in determining the new route.

Response: Descriptive data on the Provo segment of the transmission system appear in Chapter 1, Part 6, Transmission Lines. Criteria used for the proposal were the Federal Aviation Administration report and a joint resolution by the Utah County Commission, Provo City Commission, Provo Planning Commission, Provo City Airport Board, Chamber of Commerce Aviation Committee, and Provo Chamber of Commerce (see Letter No. 14). The ultimate decision for placement of the route will be made by the Provo City and Utah County Commissions.

(4) Comment: Coal - Page 1-58 states "Only coal from the Hiawatha seam would go to Emery." The DES states that approximately 84 million tons of coal will be consumed during the 35-year economic life of the plant. Peabody Coal Co. estimates that 70 million tons of Hiawatha coal exists in their lease areas. Of this, they estimate that 70 % is recoverable (although later in the DES 57 % is figured as recoverable). At the 70 % recovery rate, 49 million tons would be mined. Thus leaving Emery with an apparent 35 million ton deficit of required coal. We could find no mention of this discrepency in the DES. We would like to know from where UP&L is planning to produce the extra low-sulfur coal for their plant?

Response: There has been a change in the proposed mining plan. Peabody now proposes to mine both the Hiawatha and Bear Canyon seams of the Wilberg lease. According to the USGS, there is sufficient coal in the area to provide for the economic life of the plant. A description of the new proposal is included in Chapter 1, Part 5, Coal Source.

(5) Comment: Mitigating measures - The UEC suggests that UP&L post a "performance bond" guaranteeing that their power plant emissions will not exceed the stated emission levels. We feel that this is a viable and practical economic deterrent which insures that greater pollution does not occur. The performance bond has been used with great success in several states, since it bypasses the litigation and court action, and delay of time that would occur if a suit was brought for violation of stipulated emission levels. A performance bond would be of great public service, as UP&L would demonstrate good faith by supporting their contention that useage of a low-sulfur coal will not result in significant deterioration.

Response: The EPA New Source Performance Standards (NSPS) 40 CFR part 60 require that UP&L install continuous instack monitors to measure plume opacity, SO_2, and NO_2 emitted from the stack. The regulations also require that certain standards be met for these pollutants. The State will also install air samplers around the plant. A discussion of UP&L monitoring plans is contained in the Monitoring Program, Part 12, in Chapter 1. The NSPS regulations give EPA and the State the authority to shut down the plant if such standards are not met. Therefore, these regulations preclude the necessity of posting a "performance bond."

(6) Comment: Human Resources - Beginning on pg 2-78, the DES on human resources makes several assertions that are contradictory or ambiguous at best. For example, on the bottom of pg 2-78 "Carbon and Emery counties are isolated from the rest of the state by natural barriers; consequently, most socio-economic activity should occur locally." On pgs 2-82 and 2-83 we are informed that "Carbon and Emery Counties have a service based employment ratio lower than the national average due to the nature of the rural economy and proximity of other population centers. Some goods and services are obtained...in Provo and SLC."

Response: Carbon and Emery counties are in physically remote areas, so nearly all the people who work in the area must also live there. Most of the socio-economic activity occurs in Castle Valley, but many people do go to Provo and Salt Lake City for occasional shopping trips. The economic multipliers are service based, and lower than the national average. The lower multiplier is primarily a result of mining, and the exporting of coal. In other words, coal exported to other areas creates service-oriented jobs in those areas, not locally.

(7) Comment: Again on 3-76, "Since Emery construction started, employment in all sectors has increased." If there is a correlation between Emery construction and increased employment in all sectors, then table 3-14 fails to show it. If the statement is to be taken simply as "employment in all sectors has increased," then the structure of the sentence should be done in order not to show a cause-effect relationship.

Response: The reference to employment sectors is to point out the time factor only. Presently, Emery is creating very few jobs in sectors other than construction. At present, 360 men are working at the Emery site. The increased employment in Carbon and Emery Counties is primarily from energy development other than the Emery power project. Emery would increase the population by about 12 percent over a 7-year period, see Chapter 2, Part 12, Human Resources.

(8) Comment: The same may be said again for the statement of pg 3-77, "If construction on the Emery complex continues, mining and other types of construction would continue to increase." In light of what is said on pg 2-93, this statement is not true.

If it is intended as an open-ended comment, then the ambiguity in this and many other statements needs to be corrected.

Response: The sentence has been changed to indicate that mining projects and other construction projects would continue even if the Emery project were abandoned, see Chapter 3, Section M, Human Resources.

(9) Comment: Another example of inaccurate or incomplete information is found in table 2-15 on pg 2-80. This table lists the estimated population of communities in Carbon and Emery Counties. A sum of this figure shows the population to be 15,810. This figure does not correlate with the population figure of 26,022 cited at the top of the page.

Response: Table 2-15 shows an estimated population for some of the major towns in the counties, not total population. The table caption

refers to estimated population of communities, not entire counties.

(10) Comment: Subsidence - The UEC requests further information as to what the federal land managers (i.e. U.S. Forest Service) plan to do about the serious problem of subsidence on over 4,600 acres of land on the Wasatch Plateau. In addition, approximately 180-acre feet of ground water may be lost due to geological disturbances caused by activities in the Wilberg Mine. The combined impact represents a serious long-term loss of wildlife, grazing and recreation activities. The UEC is very concerned about this subsidence problem since 1) it is occurring in many places along the Wasatch Plateau, 2) it will forever render thousands of acres of valuable forested lands unsafe for other uses.

Response: Affects of subsidence are unavoidable and are discussed in Chapter 5 under Wildlife, Land Use, Human Health and Safety, and Water Resources.

(11) Comment: Water - The use of 7,000 acre-feet of water per year, in our opinion, constitutes a major commitment of this precious commodity, especially in an arid, semi-arid part of the state. The UEC would like to see charts, tables, illustrations, etc., on how this water use is compatible with the hydrology of the area (see Hydrologic Inventory of the San Rafael Study Unit by Utah Division of Water Resources). Specifically, we feel that there needs to be explanations as to consumptive and non-consumptive uses of water by the power project and how it relates with other uses of water in that area.

Response: The 7,000 acre-feet represents a change in water use from agricultural to industrial. This amount has been adjudicated for a number of years for agricultural purposes. The impact analysis of this change has been discussed in Chapter 3 under the Water Resources and Land Use sections.

(12) Comment: P.S. Figures on per year SO_2, NO_x, and particulate emissions are anything but approximate, as reflected on pages 5-4 and 5-5. Would you please revise?

Response: The SO_2, NO_x, and particulate emission calculations are approximate, based on estimated plant operating parameters only. However, the figures can be relied upon as being very close to actual emissions. Actual emissions can be determined only if the project were approved and the plant were in operation.

cc. Gordon Anderson, Friends of the Earth (Letter No. 29)

(1) Comment: Four of these plants, with a total of 6,360 megawatts planned capacity (I.P.P. 3,000 mw, Garfield 2,000 MW, Warner Valley 500 MW, and Emery 860 MW) would be located within the midst of several nationally significant natural, scenic and recreational resources in Southern Utah. The combined output of these plants would be four times greater the power production proposed for the same time in any nearby state.

What will be the cumulative effects of power developments to the Colorado Plateau region? The draft EIS states (6-7) "there are presently insufficient data to definitely and finally evaluate long-term cumulative effects of the present energy development scenario on air resources, visibility and elemental build-up through long-range transport to areas of higher accumulation."

Response: The Air Quality section B, of Chapter 6 has been revised to indicate the interaction of existing and proposed power plants with other energy development projects in Utah, Nevada, and New Mexico. The Garfield site was not considered within this interaction because it is not currently a firm proposal of any power company.

(2) Comment: The National Park Service has stated in the Kaiparowits draft EIS comments "Fossil fuel plants have already had an adverse impact on the air quality in the 4-corners region. Existing and proposed sources of air quality impairment in the region threaten the integrity of many nationally significant resources including at least 20 units of the National Park System."

By endorsing a proposal-by-proposal approach to evaluating these massive projects, the Interior Department advocates a policy which would result in an adequate assessment of cumulative impacts only after all the projects are constructed and in operation. At that time, the integrity of the parks will have been sacrificed and discussion of suitable alternatives would be academic.

Accordingly, the Interior Department should prepare a comprehensive environmental impact statement to evaluate cumulative effects of the existing and proposed power developments within the Colorado Plateau. Such a regional EIS could determine how many, if any, power-related facilities should be allowed in the Colorado Plateau. In addition, the report could outline more suitable alternatives to the proposed mine-mouth electrical generating facilities. The presence of the existing Southwest Regional Energy Study is persuasive evidence of the need for a suitable regional EIS.

Response: See response to Comment No. (1) above.

(3) Comment: The draft EIS is a product of a great deal of effort and presents a large amount of data in a fairly concise and well organized manner. The lack of repetition and excessive volume as compared to previous EIS statements prepared by the Utah BLM is greatly appreciated. However, the lack of detail in Chapter 6," The relationship between local short term uses of Man's environment and the maintenance and enhancement of long-term productivity," containing 19 pages, and Chapter 7, "Any irreversible and irretrievable commitments of resources which could be involved if the proposed action should be implemented," containing only 11 pages, indicate a serious lack of attention to these chapters, and their topics.

Response: The length of Chapters 6 and 7 was determined by the identification of resources affected, their relationship with long-term productivity, and the commitment of those resources. A more complete

discussion has been added to the Air Quality section B, in Chapter 6.

(4) Comment: The entire Emery Power Plant proposal is based upon the assumptions submitted by Utah Power & Light which indicates a total need of 3,028 megawatts of electrical energy required in the market area by the winter of 1980. During the 1975 through 1980 period, the company estimates an annual increase of 10.4 %, some 4 % greater than the expected national growth of electrical demand. There is no justification presented in the draft EIS for this growth in demand. In addition, no independent analysis of future electrical demands for the UP & L market area is presented. The EIS should contain at least an explanation of the forecasting methodology employed by UP & L in conjunction with the appropriate supporting data so that concerned individuals could arrive at their own conclusions.

Response: The figure 2,969 MW has been added. Additional data on forecast needs are found in Appendix III and in Chapter 8, section M, No Action. The BLM did not feel that performing energy demand analyses was within the scope of the ES. The analysis by UP&L was reviewed by the USBR and determined to be accurate. This was also substantiated by the State of Utah Public Utilities Commission (Appendix I-7).

(5) Comment: Therefore, it would appear conservation will become the most important alternative to the production of additional electricity at ever-increasing exponential rates. The age of rapid growth in electrical capacity is over. Our society is now entering an era when investment in conservation is more beneficial than the construction of new generating capacity. The draft EIS does not fully and properly account for the reduction in electrical growth demand that conservation can and will have to make in the future.

Response: The viability of energy conservation as a means for reducing electrical growth demand is discussed in Chapter 8, section K, Energy Conservation. Until incentives are provided, energy conservation cannot be considered as an actual and viable energy alternative. (See response to Comment No. (6) Letter 16.

(6) Comment: Alternatives to the Emery Project, although not under consideration by UP & L, are not discussed in a comprehensive manner and do not provide sufficient information with which to evaluate their full environmental impact. Specificially, the alternative of increased utilization of renewable resources deserves greater attention. The draft EIS states (8-174), "The state of the art of solar power has not been developed to an extent that solar power can be considered a viable alternative." However, the Federal Energy Administration has stated, "recent analyses by several industrial firms have shown solar heating and cooling systems to be competitive where there is high insolation and where costs of conventional fuels are also high." The applications of solar heating and cooling include between 25 % and 33 % of all U.S. energy use, according to FEA Solar Energy report.

A large amount of additional credible data is currently available to indicate solar energy is a viable alternative to the construction of

additional coal-burning power plants. The final EIS should more fully account for the availability of solar power as an alternative power source.

Response: See response to Comment No. (6) Letter 17.

(7) Comment: The draft EIS states (8-8), "the description of the project submitted to BLM by the Company contained no provision for SO_2 control." In another section, the draft EIS states "The proposed power plant lies within an area presently classified as Class II under the Federal Prevention of Significant Deterioration Regulations, 40 CFR 52. However, since construction of the Emery plant was approved in December 1973, these regulations do not apply." However on Page 8-127, the draft EIS states, "The EPA maintains that indeed the plant does fall under the authority of the Prevention of Significant Deterioration Regulations if the plans to include SO_2 scrubbers were cancelled after the regulation went into effect." The letter from EPA Regional Administration John A. Green to Verl R. Topham of the Utah Power & Light resolves any discrepancy involving the issue of the installation of SO_2 scrubbers with these statements;

"We have reviewed your recently submitted letter concerning proposed plans for three steam electric generating units in Utah (Huntington #2 and Emery #1 and #2) and the request for determination on the applicability of 40 CFR Section 52.21 contained therein. It is the determination of this Agency that the proposal to eliminate scrubbers from the described units would constitute a modification within the scope of the Federal regulations pertaining to prevention of significant deterioration. Consequently, such modification would subject the three generating units to the requirements of 40 CFR Section 52.21."

"Our conclusion is premised upon the finding that the elimination of scrubbers is a significant alteration to the originally approved design plan and that such alteration occurred after June 1, 1975 date specified in the Federal regulations. The alteration clearly fulfills the criteria set out in the definition of modification, 40 CFR Section 52.01 (d), in that it constitutes a physical and operational change resulting in a substantial increase of the SO_2 emission rate over the original base."

Therefore, there is little doubt that the Environmental Protection Agency will exercise its authority to require the installation of SO_2 scrubbers on the Emery Plant. Why then does the BLM choose to refute the authority of this decision, assume the position of UP & L, and publish the draft EIS with the erroneous assumption that SO_2 scrubbers will not be an integral part of the Emery Plant's design?

Such an omission is a grave error as it directly contradicts the decision of the Environmental Protection Agency.

The final EIS for the Emery Project should correct this serious fault and assume the plant will be built with the required SO_2 scrubbers, whether or not they are included in the UP & L proposal.

Many of the assumptions made regarding the effects of the pollutants from the Emery Plant are very subjective and not supported by data contained in the EIS.

Response: Assumptions made regarding effects of pollutants are based on studies referenced in the text. The BLM has evaluated the proposal as submitted by UP&L which does not include scrubbers. Chapter 8, Section C, Alternative Plant Design and Operating Methods, discusses the use of scrubbers as an alternative.

The evaluations of impacts resulting from pollutants were based on best available knowledge of pollutant effects on human health, vegetation, aesthetics, and wildlife. (See response to Comment No. (5) Letter 27.

(8) Comment: Regarding the yellowish discoloration due to NO_x emissions, the draft EIS states (3-18), "Such conditions have often been observed from emissions from each of the 750-MW units of the Navajo Power Plant (USPI, 1976), but have not been observed from the 415-MW unit of the Huntington Power Plant (thus far)." Also, the draft EIS claims (5-7), "Similar emission rates and meteorological conditions existing at the Huntington Plant have not produced visible discoloration." and, (3-26), "The plume at the Huntington Plant has been virtually clear during operation thus far."

These statements sound somewhat familiar to the popular comment often made by UP & L officials and Utah politicians, who have stated, "A person standing next to the stack at Huntington would not be able to see any emissions." However, it is doubtful that these same observers would be able to detect any pollution should they be positioned in the middle of the plume.

It is very disconcerting to read such a similar and clearly erroneous statement presented as factual data within an Environmental Impact Statement. It should be pointed out that many observers, including myself, have detected a noticeable and highly objectionable yellowish discoloration of the atmosphere that could be traced directly from the NO_x emissions from the Huntington Plant extending across the San Rafael Swell region.

Response: In Chapter 3, Section C, Air Quality, Nitrogen Oxides, it is stated that visible yellow discoloration could possibly be produced by the Emery complex. However, it is doubtful that any yellow discoloration across the San Rafael Swell would be observed as the result of estimated concentrations from the Emery plant since none are being observed from similar concentrations of NO_2 being emitted from the Huntington plant. Figures 6-2 and 6-5 show the expected annual average concentrations of NO_2 from the Huntington and Emery plants (with and without flue gas desulfurization). The illustrations show that these concentrations would be quite low. Yellow discoloration, attribuitable to the Huntington power plant, has not been documented.

(9) Comment: The conclusions regarding visibility (3-27), "it is expected that the operation of the Emery Plant would not have a significant impact on visibility." and, (3-55), "The probable low volume of particulates and concentrations of NO_2 from stack emissions into the atmosphere of the region would not reduce the visibility and aesthetic experiences of the viewing public based on observation at the Huntington Power Plant," are not supported by adequate factual data. As previously noted, the

pollutants from the Huntington Plant have been observed to have a noticeable effect upon the visibility and aesthetic quality of the air resources over the San Rafael Swell region.

The 83-92 tons of SO_2, 70 tons of NO_x, and 4.29-5.29 tons of particulates which will be the minimum amount of emissions from the Emery Plant daily will quite probably have a much more serious affect on the region air resources than the draft EIS is willing to concede. The final EIS should more correctly and objectively address these potential adverse impacts the Emery Plant will have on the air resources of the region.

Response: Statements regarding visibility are based on studies of the area. The impacts of pollutants, with regard to air quality standards, have been further defined. The quantities of emissions expected from Emery would be low compared to the majority of those emission sources listed in the EPA National Emission Data System. The impacts of these emissions have also been further illustrated by diffusion modeling. The modeling illustrates the pollution concentrations around the plant and surrounding area in the form of isopleth lines. Twenty figures have been added showing the impact of pollutants on the various standards with and without the plant using flue gas desulfurization. (See Chapter 3, Section 3, Air Quality).

(10) Comment: The emission control equipment will remove much of the visible particulates, yet it is the invisible micron and sub-micron particles not controlled by the precipitators which pose the greatest threat to public health and welfare.

Several points should be made about the problems resulting from these particulates smaller than two microns which would escape the precipitators.

Toxic trace elements, including mercury, arsenic, fluorine, beryllium, cadmium, lead, molydenum, selenium, et al., which are in the Hiawatha coal would be released during combustion. Volatile trace elements; fluorine, arsenic, mercury and molybdenum are emitted from the stack in the form of particulates less than two microns in diameter.

Large scale coal-fired power plants emit quantities of trace elements which are known to be hazardous to all biological species. The extent to which these elements enter the ecosystems is not well documented. However, a lack of documentation should not be assumed to correlate with a lack of significance.

Response: In Chapter 3, Section 3, Air Quality, it is stated that a comprehensive trace element study was performed at a plant that had been in operation for 14 years, and operating during many of the years without emission controls. The study concluded that emissions from the plant had no major impact on trace element concentrations in the environment. Long-term effects of such emissions from power these plants will require futher study.

If UP&L were required to install scrubbers at the Emery plant, the more harmful submicron particles would be reduced by approximately 50 percent. Scrubbers would also reduce the amount of trace element being emitted from the plant. The scrubber alternative is discussed in Chapter 8, Section C, Alternative Plant Design and Operating Methods.

(11) Comment: Stationary fuel combustion already contributes 8.1 x 10^6 metric tons or approximately half of the particulates emitted annually in the U.S. Particulates interfere with terrestrial infrared radiation, scatter solar radiation back into space, and reduce visibility. These meteorological, geophysical, and climatic changes affect the entire globe. A marked reduction of visibility which is associated with these more serious changes has already been observed in the Four Corners area since the completion of several coal-fired power plants in that area. The draft EIS clearly indicates that the Emery project would further this degradation of visibility.

Particulates and gasses may undergo or act as catalysts for a variety of reactions which transform these substances into more toxic secondary pollutants. This is particularly true in the case of photochemical smog. Pollutant concentrations are directly related to the density of industry and the use of fossil fuels for power and space heating.

The size of particulates is extremely important. Fifty to eighty percent of particulates smaller than one micron are absorbed into the blood stream from the lungs. Larger particulates are trapped by the respiratory system and directed to the stomach where the absorption rate is only five to fifteen percent.

The 4.29-5.29 tons of particulates emitted daily from the Emery project under ideal conditions would indeed be of a very toxic nature due to their small size. The draft EIS does not qualitatively describe the nature of these particulates and the extent to which these elements could affect the area. A closer look at some of the elements contained in the emissions is helpful in assessing the magnitude of the problem.

Response: Toxicity is not related to size of particles, rather to concentration. Emissions from the Emery complex would be within the standards set for protection of human health and welfare. Predicted release of trace elements is covered in Table 3-5. (See response to Comment No. (10), Letter 29.)

(12) Comment: During combustion, approximately half the fluoride in coal is emitted as gaseous hydrogen fluoride, silicon tetrafluoride, and particulate matter. From the total of 402.3 million tons of coal burned in the United States in 1968, for steam and energy production, fluoride emissions to the atmosphere have been estimated at 16,000 tons. Hydrogen fluoride of silicon tetra-fluoride are among the most toxic of all pollutants important to agriculture. Food chain concentrations of fluorides has already been observed to affect cattle. Fluoride ingestion can cause osseous lesions, lameness, appetite impairment, decrease in weight gain or diminished milk yield. Because the Emery project will be located in an agricultural area increased considerations of these toxic compounds should receive more careful analysis in the final EIS.

Response: A discussion of fluoride emissions and effects is included in Chapter 3, Section C, Air Quality. Even though fluoride compounds are emitted in large quantities relative to other trace elements, they generaly are not emitted in a reactive state. The EPA has not determined that fluoride emissions from power plants are dangerous to human health and vegetation.

(13) Comment: Radioactive emissions are not dealt with qualitatively in the draft EIS. The hazard associated with these elements and the half lives of the isotopes are not mentioned. The long-term genetic changes that could be induced by these elements should not be overlooked.

Response: Due to the relatively small amount of radioactive elements that would be released, as compared to the naturally occurring radioactivity in the soils, it was determined that a qualitative analysis was not necessary.

There is no evidence at this time to indicate that the emissions of radioactive compounds from coal-fired power plants are in quantities harmful to human health. (See Chapter 3, Section C, Air Quality.)

(14) Comment: The Emery draft EIS fails to adequately address the problem of trace element emissions and radionuclides by assuming these pollutants will fall within maximum safe concentrations. However, the draft EIS concludes (3-21) "Such trace metals may eventually accumulate in some ecosystems near the plant, but there are presently insufficient data to determine the amounts." and (3-23), "The long-term accumulation of trace element releases from power plants is not well known."

Overall, the passive attitude of measuring trace element increases does nothing to prevent or solve the long-term cumulative problems. Evidence from past developments indicates that trace element toxicity could be a problem of great enough magnitude to seriously effect the health of plants, animals, and man in the entire area. Therefore, more serious consideration should be given to dealing with these harmful contaminations in the final EIS.

Response: The discussion in Chapter 3 on trace elements points out that a comprehensive trace element study was performed around a coal-fired power plant which had been in operation 14 years. The study found no major impact from trace element in the environment. (See reference to Atomic Energy Commission study in Chapter 3, Section C, Air Quality.)

(15) Comment: The statement regarding ozone (3-20), "there is presently no scientific evidence that the proposed Emery Plant would contribute to a violation of air standards with this pollutant" is not an adequate analysis of this pollutant. The cumulative effects of ozone pollution not only from the plant's emissions, but by the Corona discharge from the transmission lines should be quantitatively and objectively assessed in the final EIS. These considerations are very important considering the health and biological hazard posed by ozone.

Response: Because of the combustion temperature, the ozone production caused directly by the plant would be low. A paper, "Electrical Effects of Transmisssion Lines," prepared by the Bonneville Power Administration, states, "Experience and studies to date indicate that the amounts of oxidants produced by transmission lines have no adverse effects on humans, animals, or plants."

(16) Comment: The Colorado Plateau region is rich in outstanding scenic, natural, recreational and wilderness resources. The Bureau of Land Managment administers extensive de-facto wilderness areas in the

region including three primitive areas, a number of natural areas and recreation sites, several proposed primitive areas as well as two proposed national conservation areas, including the San Rafael Swell. This spectacular natural area will be gravely threatened by the effects of the Emery Project and its associated population increase. The final EIS for the Emery Plant should contain a more detailed assessment of the effects the project will have upon this area's wilderness resources and propose suitable mitigating measures to minimize these environmental impacts.

Response: Impacts are covered in Chapters 3 and 4 under the Soils, Vegetation, Scenic Resources, and Land Use sections. The assessment was based on the anticipated impacts resulting from the Emery project.

dd. Charles M. Albrecht, United States Department of the Interior, U.S. Geological Survey (Letter No. 30)

(1) Comment: Appendices 1-3, Check page numbers against Table of Contents.

Response: Table of Contents has been corrected.

(2) Comment: Under Coal--70,000,000 tons from Hiawatha seam of Wilberg Mine, should add "and vicinity of Wilberg Mine."

Response: Chapter 1, Part 5, Coal Source, now reads, "Eight-four million tons from the Hiawatha and Bear Canyon Seams of the Wilberg Mine." This has been changed as a result of a new mining plan submitted by the Peabody Coal Company.

(3) Comment: Page 1-17 Generating Stations. Why not include both Gadsby Plant in Salt Lake City, Utah, and Naughton Plant in Kemmerer, Wyoming?

Response: The Gadsby and Naughton plants were not included since they are unrelated projects (due to intervening elevated terrain and distance).

(4) Comment: Mineral Development. Add "approximately" before "5,000,000 tons." On pages 1-17 and 1-20, the projected increases in coal production from approximately 5 million tons in 1973 and 20 million tons in 1979 for Carbon and Emery Counties is too high. Under past, present, and projected production estimates, a figure of 10 million tons of coal in 1979 appears more realistic.

The above tonnage figure is based upon the following estimated yearly production:

Year	Federal Leases	Fee Lands	Total
1972	2,000,000	2,500,000	4,500,000
1973	2,160,000	3,080,000	5,240,000
1974	3,200,000	1,600,000	4,800,000
1975	2,520,000	1,980,000	4,500,000
1976	3,440,000	2,460,000	5,900,000

Fifth line from bottom of page. Add "or follow EPA, State, and Forest Service discharge requirements at the Wilberg Mine."

Response: The figure has been changed to 50 percent as a result of comments by Peabody Coal Company. As a further result of Peabody's change in mine plans, excess mine water would be pumped to the Deseret Mine via the Anderson Mine (see Chapter 1, Part 5, Coal Source). Should an emergency occur, the water would be discharged down Grimes Wash. A discharge permit would be required as shown in Chapter 1, Section B, Government Authorizing Actions.

(13) Comment: Pages 2-25 through 2-30. A. Geology. The description of the geology of the area surrounding the Wilberg Mine is too brief. The structural and stratigraphic relationships between the coal and other formations have not been addressed. A revision of this section should include the following:

(1) A geologic map on a topographic base (scale of 1:24,000 or larger) of the area, extending from the Deer Creek Mine to the Emery site.

(2) A complete stratigraphic column, with descriptions of the formations both above and below the coal seams.

(3) A description of the structural relationships and topographic characteristics of the formations.

(4) A site specific description, including maps, of the coal characteristics, stratigraphic relationships, and overburden thicknesses for both seams.

(5) A general description of coal reserves in the Wasatch Plateau and history of development (including past, present, and future mines on Federal, State, and private lands).

(6) A more complete discussion of oil, gas, uranium, and other mineral development in the area, the relation to coal development, and cumulative impacts of such developments.

Response: Chapter 2 describes only that portion of the human environment that would be affected by the proposal. The major impact to the geology and topography of the area would be subsidence in the mine area. Elements of the environment that would be related to subsidence are discussed in Chapter 2, Part 3, Geology and Topography.

Coal reserves on East Mountain and the Wasatch Plateau are discussed in Chapter 3, Section D, Minerals. Present and future coal development is discussed in Chapter 1. A history of coal mining was not included because it would not add clarity to the document in relation to future mining on federal land. Only existing leases planned for production are discussed. Other plans will be included in a Central Regional Coal ES.

The USGS Area Mining Supervisor, Salt Lake City, and the USGS resource specialist for oil and gas indicated that, to date, coal mining has not affected oil and gas leasing in Central Utah.

(14) Comment: Page 2-25. The initial discussion of geology is made in Chapter 2. While it is apparent that subject material in an EIS is handled in a succinct manner, it appears that the discussion of geology

is weakened by being too brief. For example, the names of the coal beds (Hiawatha and Blind Canyon) are not mentioned. The coal beds are identified by name in the introductory chapter on page 1-58. However, we feel they should be treated in Chapter 2, where the principal discussion of geology is found. Only a brief account of stratigraphy is given, and then only for rocks above the coal bed. No mention of the stratigraphic sequence below the coal could be found.

Although the structure is relatively simple, a more fully developed discussion of the coal structure and relationship to the regional structural pattern would improve the presentation.

Response: A discussion of the coal beds has been added to Chapter 2. The stratigraphic sequence below the coal beds and the regional structural pattern would not be affected by the proposal. A discussion of the coal beds and the relationship to each other and to the Black Hawk Formation has been included in Chapter 2, Part 3, Geology and Topography.

(15) Comment: We could find no mention of existing oil and gas leases in the Wilberg Mine area or in the power plant area. A telephone call to the BLM elicited the information that oil and gas leases do cover the mine area. Some discussion of the impact of possible oil and gas exploration over the mine area is necessary. This would also hold for the power plant area and ancillary portions of the project.

Response: See response to Comment No. (6), Letter 30.

(16) Comment: It is difficult, in many instances, to make precise cadastral locations, because many of the maps do not have adequate marginal information to pick out township and range numbers. In some instances, the section numbers are missing.

Response: Where applicable, information has been added to maps.

(17) Comment: Page 2-27. Check list of illustration, Figure 2-28, is on page 2-24.

Line 2, It might be better to take out "Nearly Level."

Line 7. The spelling of "Stokes" is wrong.

North Horn Formation. Change "Approximately" to a small "a."

Third line from bottom. It might be better to add "effects of" before "gravity."

Page 2-29. "Fractures" would be a better word to use than "cracks."

Response: Corrections have been made.

(18) Comment: The environmental aspects of the coal mining operation have not been adequately addressed. More detail should be included for the following:

(1) The chemical and physical impacts of mining on the hydrologic system.

(2) The areal extent, magnitude, and duration of subsidence.

(3) The effects of subsidence on soils, water resources, vegetation, land use, and human safety.

(4) The cumulative impacts of the Deer Creek and Wilberg Mines and other operations in the area.

Response: The USGS has indicated that mining would not impact the hydrologic system chemically. The physical impacts of mining are discussed in Chapters 2, 3, 5, 6, and 7 under Geology and Topography.

The areal extent, magnitude, and duration of subsidence are discussed in Chapter 3, Section D, Geology and Topography.

The effects of subsidence on Water Resources, Vegetation, Land Use, and Human Health and Safety are discussed in Chapter 3.

Cumulative impacts are discussed in Chapter 6, Section D, Geology and Topography.

(19) Comment: Check page numbers with Table of Contents.

Appendices. Page 3-94, Appendix 3-1, Magnitude of Contrast, is missing from the draft.

Response: Corrections have been made.

(20) Comment: A. Transmission line impact. The figures on Tables 3-6, 3-7, and 3-8 are based on the disturbance of .25 acres per tower. These figures do not appear to reflect the additional disturbance due to the clearing of "hazardous" vegetation along the right of way. There are several areas of deciduous or coniferous forest in areas with moderate to high potential for landslide and soil erosion (Appendix II-3). This possible impact should be further explained.

Response: Impacts resulting from corridor clearing and construction of the transmission line are discussed in Chapter 3, Section E, Soils. The potential for landslides and soil erosion has been identified; however, application of mitigative measures (Chapter 4, Section B, Measures Required by the Applicant by Federal Agencies) would reduce or eliminate such impacts on federal lands.

Disturbance due to the clearing of hazardous vegetation is discussed in Chapter 3, Section J, Scenic Resources. Landslides are discussed in Chapter 2, Part 3, Geology and Topography, and soil erosion is discussed in Chapter 3, Section E, Soils.

(21) Comment: Page 4-11. 2. Geology and Topography. Change "is no practical" to "are no practical means," etc.

Response: The entire section discussing "No practical means" has been removed from Chapter 4.

(22) Comment: Page 5-7. Fourth line from bottom. Change 70 percent to 50 percent.

Response: The figure has been changed.

(23) Comment: Page 5-8. Line 5. "Fractures" would be a better word to use than "cracks."

Response: The term has been changed.

(24) Comment: Unavoidable adverse impacts. It states that "many of the impacts identified here can be avoided, but because of lack of regulations, policies, or other incentives, they most likely would not be." This needs clarification. Some impacts should be identified, along with possible sources of mitigation (such as the enforcement or establishment of county, State, or Federal regulations, policy changes, etc.)

Response: Impacts that cannot be avoided through enforceable or committed mitigative measures are discussed under the appropriate headings in Chapter 5. Mitigating measures that would be applied are discussed in Chapter 4. As indicated, "many of the impacts identified can be avoided, but because of lack of regulations, policies, or other incentive, they most likely would not be." For this reason, mitigative measures which are real and committed are the only measures that have been included.

(25) Comment: Paragraph 4, line 2. "About 150 additional miners would be needed." From page 2-82, it was noted that 350 miners are in the Deer Creek Mine and, with 150 additional, there would be only 500 total miners involved. At least a total of 600 (latest proposal) are needed. Accordingly, we suggest changing 150 additional miners to "About 250 additional miners would be needed." This change should be reflected on page 2-82 as well.

Response: The text has been changed.

(26) Comment: Pages 8-113 through 8-126. The footnote on Table 8-13, Summary, Environmental Impact Rating, (page 8-115) indicates that the matrix for the Emery Project is included in the Foreword, which it is not. From data in other tables, the impact score for the Emery is 58, higher than the alternative Huntington and Sevier sites and lower than the Garfield sites. These impact scores form a basis for site selection. The rationale for selecting the Emery site over the alternative sites is not clear from discussions in the EIS.

Response: The matrix has been deleted from the Foreword. The footnote has also been deleted. The rationale for site selection was supplied by UP&L, and is included as Appendix I-2. Also see Chapter 8, Section B, Alternative Sites for Coal Fired, Steam-Electric Generating Plants.

(27) Comment: Page 8-145. Line 3. Change "from the Wilberg-Deer Creek mining complex" to "from the Wilberg-Deer Creek mining complex and adjacent leaseholds."

Response: According to the USGS, the Wilberg-Deer Creek mining complex has in excess of 200,000,000 tons of recoverable coal which would be enough coal for the four units to operate for 35 years without using adjacent leases.

(28) Comment: Page 8-147. Line 2. Change "more coal can be removed from the face" to "more coal can be removed from the face in a single operation."

Response: The text has been changed.

(29) Comment: D. Maps and Figures (all Chapters). Most of the maps have no scale or spatial references (township, range). Wherever possible, surface ownership should be indicated on maps and figures.

Response: Where applicable, information has been added.

(30) Comment: Since the operating Number 1 generator at the Huntington power plant was destroyed, we believe some comment should be mentioned concerning a like occurrence or extended "outage" at either plant in the future and the overall impacts on the area.

Response: Such outages are not predictable and could occur anywhere in the system; therefore, they were considered to be beyond the scope of this ES. The outage of the first generator at Huntington is temporary. Utah Power and Light will purchase power from other power systems until the second unit goes on line in February, 1977. Since this type of power outage is temporary and since power can be purchased from other power systems until a generating unit is repaired, discussion of the problem was considered unnecessary.

(31) Comment: Likewise, some thought might be given to an explosion, cave-in, extended work stoppages, etc., at the mines supplying coal to the generating complexes and the impact involved.

Response: Impacts to human health and safety are discussed in Chapter 3, Section N. The supply of coal to the generating complex during such incidents is discussed in Chapter 1, Coal Storage Area.

The consensus of the interdisciplinary team was that any action causing an extended work stoppage was beyond the scope of the ES.

(32) General Comments on Water Resources. In general the draft statement is adequate in its consideration of most ground-water impacts. We suggest that dewatering impacts on ground-water levels in the area surrounding the project construction site should be considered. Furthermore, although the quality of the shallow ground water seems to be rather poor at the construction site, the statement should consider monitoring at least one or more key or diagnostic constituents in the immediate vicinity of any ponds containing high concentrations of pollutants, to determine the integrity of the liners.

It is indicated that two existing drain fields are discharging ground water from the construction area containing about 9,000 parts per million of total dissolved solids at a rate of about 80,000 gallons per day (p. 1-55, par. 3). The location and hydrologic characteristics of the ground-water drainage disposal area should be evaluated in order to minimize any adverse effects on existing water resources of the project area.

Response: Because of the nature of the soil (Mancos Shale derived), low rain fall, drainage of water tables, and poor quality of surface and

ground water, impacts from ponds would not be significant. The shallow ground water table is present as a result of irrigation. Land owned by UP&L west of the plant and the plant site itself would no longer be irrigated. Drains have been installed to remove the water. As a result of these actions, the shallow ground water would be removed. In addition, the drain fields are located so as to prevent ground water from entering the plant area.

(33) Comment: The frequency and magnitude of flooding of Rock Canyon Creek should be assessed in order to minimize any adverse effects on the power-generating complex resulting from high intensity thunderstorms (p. 2-46, item b. 11).

Baseline data on water-level fluctuations of Snow and Flag lakes should be obtained in order to assess any adverse effects on lake-level changes that may result from mine subsidence (p. 5-11, par. 2).

Response: Utah Power and Light has assessed the possibility of flooding in Rock Canyon Creek at the power plant site and determined that storms would not adversely affect the generating complex. This was the same conclusion by VTN, that did the environmental analysis of Emery under contract to BLM. The USGS will require the applicant to monitor surface waters above the lease area.

ee. Nina Dougherty and Sherman Janke, Sierra Club, Utah Chapter (Letter No. 31)

(1) Comment: The Sierra Club supports EPA's position that the units are subject to meeting incremental limitations of Class II. The State of Utah and UP&L contend that scrubbers are not "practical." The Sierra Club contends that scrubbers are practical and that 92 tons per day is an excessive amount of SO_2 to be issued from one source. We take issue with statements on p. 8-129, "In other words, significant impacts from SO_2 would not be expected even with no control. Therefore, with control and lower emission rates there would also be no impacts, regardless of whether the control would be 80 percent or a lower lever." Such statements reflect a position on NAAQS considered by many to be untenable--namely, that all atmospheric and all long term low level health effects are known, and that there are no ill effects or that there is a threshold in level of pollutants below which there are no effects. The State's position on "practical" is in fact based on the contention that there is no threshold below which there are no effects and, therefore, that control should be on a cost/benefit basis as long as NAAQS and NSPS are met--presumably the fewer people living in Castle Valley area do not present enough of a benefit potential to compensate for the cost. (Since we are concerned about the aforementioned potential effects we do not accept the State's stance on cost/benefit "practicality.")

Response: The section B, Alternative Plant Design and Operating Methods in Chapter 8 has been rewritten to reflect these concerns.

(2) Comment: On p. 8-101 it is stated that the second unit of Huntington

is planned to have a scrubber which will remove 80% of SO_2 emissions. The table on p. 8-107 shows emissions predicted when all four Huntington units are operating, three of them with scrubbers for SO_2 removal. It is, of course, not planned at this point that there be a scrubber on second Huntington unit--what is the assumption about SO_2 removal for second Huntington unit in studies done to predict interaction of Emery and Huntington SO_2 emissions?

Response: The BLM study of the Huntington plant revealed that scrubbers would be necessary on the second unit to meet the NAAQS.
A discussion of emissions from the Huntington plant and the interaction with Emery has been added to Chapter 5, Section C, Air Quality. UP&L plans to install scrubbers on the second unit at Huntington.

(3) Comment: Coal To clarify the picture on where all of the coal will be mined for the first two Emery units, the options in Chapter 8 should not be considered merely alternatives but part of the description of the project in Chapter 1--that is, if any of those options are to be used. If the coal is to come from elsewhere, that coal and mine should be described. It would be more helpful to state in Chapter 1 the amount of coal that would be used from Wilberg Mine Hiawatha seam than what exists in the seam--this would more clearly indicate the coal situation. There should be a trace analysis of the coal to be used.

Response: Coal for the Emery plant from both the Hiawatha and Bear Canyon seams of the Wilberg lease area would be sufficient coal for the economic life of the plant. An analysis of trace elements is covered in Chapter 3, Section C, Air Quality. (See response to Comment No. (4) Letter 28.

(4) Comment: In describing some of the manufacturing and mining projects that will use energy from these Emery units, there should also be an identification of the amount of electricity scheduled for the Moon Lake REA that is slated for oil shale projects. The White River Shale Project intended to use at least some electricity from Moon Lake REA. Also, how much of electricity for California Pacific Utilities Co., if any, is intended for the alumina project near Milford?

Response: Until the feasibility of oil shale development can be determined, power demands cannot be predicted. The Alunite proposal near Milford calls for a 20 MW diesel plant for construction power and a 75 MW coal-fired plant for production power.

(5) Comment: A correction that needs to be made that hopefully reflects only hurried writing and lack of thought rather than some deeper or stronger feeling is the description of Emery County as being ethnically "almost entirely white," while Price and Helper are described as being ethnically "Greeks, Italians, Spanish-American and other ethnic groups." (p.3-87).

Response: Appropriate changes have been made.

(6) Comment: The DEIS should include the costs to the county and to the people of having power plant and additional population. Energy project EIS's are particularly good at indicating tax and income benefits as if they are an absolute total gain with no additional financial costs to the people in the area. It would be helpful to show budgets of other energy impacted counties to show costs as well as benefits--in order to get a truer picture. The buying power of the income should also be indicated as the energy boom increases.

Response: Data on local capital expenditure needs have been added to Chapter 3, Section M, Human Resources.

(7) Comment: The discussion of incentives is already outdated because of legislation enacted in August which does provide loan guarantees to help finance purchase of energy--conserving equipment by some public institutions and owners of large apartment buildings and small businesses, as well as loans and loan guarantees to homeowners or renters who insulate homes, some free insulation for homes of low-income persons, and a requirement that HUD formulate energy construction standards to be incorporated in local building standards.

Response: The act passed August 14, 1976, is called the Energy Conservation and Production Act (P.L. 94-385). According to (Legislation and Plans, H.U.D., Washington D.C. (David Rasoff) the Act is not in effect at present since it has not been funded.

(8) Comment: The other energy alternatives generally suffer from the usual narrow interpretation of what it is valid to consider alternatives for. The assumption in this and other EIS's is that the only true alternative to a large coal-fired power plant is one of same size fueled by oil or gas or is nuclear or is solar powered or wind powered. Lip service is paid to direct use of solar energy, but only lip service. Energy has been supplied in a variety of ways in the past and it certainly can be in the present and future. What is particularly lacking in the energy alternatives is the concept that alternatives for the end use of the amount of energy which could be supplied by the power projects are to be considered. The idea that a combination of types of energy; centralized, decentralized or direct facilities or use; size of facilities, etc., can be considered is apparently alien to those preparing energy alternative options. Utility companies want to keep power production centralized and under their wing (witness the court battle Boston Edison Co. waged when Harvard attempted to set up a total energy plant for a hospital and housing complex); impact statement teams probably just consider it much simpler to limit alternatives to another means of generating the same amount of electricity in one site.

Response: For a complete discussion on energy alternatives see "Energy Alternatives a Comparative Analysis," University of Oklahoma. The complete reference is included under List of References.

(9) Comment: a. On mitigating measures, Chapter 4, p. 4-11: the statement is made that there is no practical means to mitigate the

addition of from 83 to 92 tons of sulfur dioxide per day. If one accepts the company plan of not including scrubbing equipment in this power plant (which is evident from Ch. 1 description of the plant and from paragraph 2. (a) of page 5-4), this may be true. Yet it seems reasonable that in a chapter on mitigating measures, reference ought to be made to how the quantity of SO_2 released could be reduced through the incorporation of scrubbing equipment. I realize that such consideration is made in Ch. 8 but it should also appear in Ch. 4.

Response: The rationale was to assess the proposal as it was received from UP&L. The proposal and impacts were discussed in Chapters 1 through 7. Chapter 8, Section C, Alternative Plant Design and Operating Methods has been revised to discuss in greater detail the alternative of using scrubbers.

(10) Comment: In Chapter 5 regarding adverse impacts: The second portion of section 2(a) page 5-4 is unclear: apparently the population increase in the area of the power plant, occasioned by its construction, would, through the normal activities of this population, result in SO_2 emissions of about 200 tons per year in addition to SO_2 emissions from the plant itself. However this is not too evident from the present wording of this paragraph.

Response: The section has been rewritten.

(11) Comment: c. In the consideration of alternatives, chapter 8. On p. 8-9 it is stated that "consideration of the Naughton site...was discarded (as an alternative to Emery) because that site has become a firm proposal for another project." I should like to know exactly what this firm proposal is, and whether it involves further plans of UP & L or some other utility company.

Response: The proposal (by UP&L) for the Naughton generating complex includes the addition of two 430 MW units and construction of a transmission line from the Naughton complex to the Ben Lomond substation near Ogden, Utah. The BLM, Wyoming, is preparing an ES on the Naughton project.

(12) Comment: Continuing in Chapter 8: On Figure 8-1, p. 8-10, the transmission line corridor from the Emery-Huntington area to Sigurd is indicated as "proposed." Is it not true that there is already a corridor along this route for an existing power line commencing at the Huntington plant? (Refer also to page 1-78 for a statement to this effect.)

Response: The illustration has been corrected.

(13) Comment: e. In the next-to-last paragraph of p. 8-45, in the discussion of a low-voltage line which might service a Garfield plant, mention is made that this 69 kV line could be of a type which would electrocute large birds of prey. I would appreciate some amplification as to what type of line would do this, and how.

Response: Many conductors on 69-kV lines are less than 43 inches apart and can electrocute large birds when their wings touch two conductors. Conductors farther than 43 inches apart reduce the chances of electrocution of large birds.

(14) Comment: f. Table 8-13, p. 8-115, the Summary of Environmental Impact Ratings: The footnote appears inaccurate, as I was unable to find this matrix with Emery included. However, if one takes the Emery impact ratings from the tables which follow Table 8-13, he arrives at a total impact score of 58 for Emery. Interestingly, this is about midway between the lower scores of Sevier and Huntington and the higher scores of the Garfield sites.

Response: The Matrix is no longer included. The footnote was inadvertently left in and has now been removed.

(15) Comment: On the cooling tower discussion beginning page 8-136. While it is true that Chapter 8 is a discussion of alternatives, it would be helpful for purposes of comparison if coal usage figures and thermal performance numbers were included for the proposed wet-dry cooling towers. That is, how much more coal would be required to fuel the wet-dry tower cooled plant in comparison with a plant cooled with wet (only) towers? What is the penalty in thermal efficiency of the wet-dry cooling system over the wet-only method, and how much additional thermal burden does the wet-dry system impose on the surroundings? On page 8-139 these comparisons are made for the dry system vs. the wet-only towers and a similar analysis for wet-dry vs. wet-only would be helpful.

Response: Coal usage and water consumption for a wet-dry cooling system are described in Chapter 1, (see Coal Source and Generating Complex). The need for additional water and savings of power and money for a completely wet cooled system are discussed in Chapter 8, Section C, Alternative Plant Design and Operating Methods. The thermal burden for either system would not significantly impact the environment.

Only, information considered relevent to describing the impact on the human environment is included. The major reason for considering use of a wet-dry cooling tower is that it would require less water than a wet tower. The major reason for considering a wet cooling tower is that it would cost approximately one-sixth that of a comparible wet-dry tower; maintenance costs would also be lower.

(16) Comment: Elsewhere in the EIS it is stated that the company would operate the plant as wet tower cooled in the summer and as dry cooled in the winter. From thermodynamical considerations this makes sense, yet there appears to be a contradiction in turbine requirements, judging from the next-to-last paragraph of p. 8-139: How can one turbine be operated at outlet conditions typical of a wet tower system for part of the time, and operated at higher back pressures occasioned by the towers operating dry at other times? An explanation of this point would be helpful.

Response: The proposal as described in Chapter 1, Section D, Applicant's Proposed, calls for addition of dry cooling sections to existing wet cooling towers. The dry sections would operate as an addition to the wet cooling towers. The turbine requirements described in Chapter 8, Section C, Alternative Plant Design and Operating Methods, apply to dry cooling towers only. Utah Power and Light is considering using a wet system in the summer and a wet-dry system in the winter. A dry system, in which the back pressures experienced would be higher than a wet-dry system, is also discussed.

ff. James E. Kee, State Planning Coordinator (Letter No. 32)

No response required.

gg. C. V. Anderson, P.E., Utah Department of Transportation (Letter No. 33)

No response required.

hh. Donald A. Smith, Utah Division of Wildlife Resources (Letter No. 34)

(1) Comment: We recommend landscaping of the plant site with shrubs, trees and other vegetation that will provide food and cover for wildlife species compatible with operations at the plant.

Many species of avifauna will inhabit the plant site if adequate vegetation is provided. Some trees and shrubs that would provide foods edible to wildlife and still be aesthetically pleasing as ornamentals are mountain alder, sand cherry, rose, Siberian pea, honey locust, Russian olive and cedar. This list is only suggestive since a complete tabulation of trees and shrubs acceptable to wildlife would be lengthy. A diversity of plant species would provide food and cover for a larger number of avian species. This would be especially true during spring and fall when migration causes a wide variety of bird species to pass through the area.

Response: The proposal by UP&L is to use native vegetation as part of the landscaping at the generating complex. However, UP&L has indicated a willingness to work with the Utah Division of Wildlife Resources (UDWR) to plant whatever vegetation that would be recommended. This discussion has not been added to the text as it attempts to mitigate an impact which was not identified.

(2) Comment: The coal conveyor system consists of two parts. The first part, an 8,000 foot feeder conveyor from the Wilberg Mine down Grimes Wash to a coal storage area, would be put in operation at the start-up of the first generating unit (page 1-64). It is noted that in the Environmental Impact Statement Report prepared by Peabody Coal Company in September, 1975, this conveyor section is specified as being 6,300 feet in length. Neither the statement prepared for the Wilberg Mine by Peabody nor the Draft Emery Environmental Impact Statement

allude to the necessity of deer crossings along this first section. Provisions for wildlife migration, especially deer, in this area should be detailed in the Final Emery Environmental Impact Statement. Also, the Statement is contradictory since on page 1-64 the length of the feeder conveyor from the mine portal to the storage yard is listed as 8,000 feet and on page 1-74, the feeder conveyor is described as being 6,300 feet long, which is the figure used in the earlier Peabody report.

The second segment of the conveyor system is described as being 13.3 miles long. It starts at the end of Peabody's "6,300 to 8,000" foot long conveyor system and extends to the Emery Plant coal receiving building. This segment includes five transfer conveyor sections and will be constructed for use when the second unit of the Emery Plant is put on line.

Actual length of the total conveyor system and its individual components are in conflict. By totaling the distances reported in the Draft (pages 1-72 and 1-73) under conveyor sections 1 through 5, (this represents the distance from the coal storage yard to the Emery Plant) a combined length of 12.8 miles (1.85 + 1.62 + 3.84 + 2.69 + 2.08) is provided. This disagrees by .5 miles with the statement on page 1-72 that the total length from transfer at point No. 1 to the Emery Plant coal receiving building would be about 13.3 miles. Also, a statement on page 1-64 indicates the entire length of the coal conveyor system will be 13.5 miles long. If the Utah Power and Light section of the conveyor is actually 12.05 miles long and the feeder conveyor 8,000 feet long, then the total system would be 13.6 miles long.

Response: The figures concerning the length of the feeder coal conveyor have been corrected. Peabody Coal Company plans to elevate the 1.5-mile (8,000 feet) feeder conveyor from 3 to 100 feet above the ground. Considering the small annual deer use the area receives (less than 4 deer days use per acre) and the fact that the conveyor would be elevated, deer movement would not be impeded.

(3) Comment: On page 1-71 it states that "provisions would be made for 24 deer and cattle crossings under the conveyor system at known game trails". A field trip with Utah Power and Light Company's environmental staff in July, 1976, indicated there were no known game trails and that locations for deer crossings could only be identified as low areas or washes the conveyor would likely cross. All of these supposedly "Game" crossings are only generally located since the exact "known" and specific route of the conveyor system is not marked on the ground. Twenty-four crossings are identified on the map on Figure 1-23, on page 1-67. An examination of the text (pages 1-72 and 1-73) shows a description of only 21 crossings under conveyor sections 1 through 5. The map shows 22 crossing points in this same area, plus two additional crossings under the feeder conveyor. Additional clarification in this area of the Draft Statement is needed.

Response: The primary proposal for the transportation of coal has been changed. The revised proposal for moving coal is to use a conveyor the first 1.5 miles and then to truck the coal the remaining distance to the power plant.

The 12-mile coal conveyor from the 25,000-ton live coal stockpile to the plant site is discussed in Chapter 8, Section F, Coal Transportation Methods. The text and Figure 8-24 have been revised in Chapter 8 to indicate elevated segments on 12 miles of conveyor as possible deer and livestock crossings.

See Comment No. (2) above in relation to game movement on the 1.5 miles of elevated conveyor.

(4) Comment: We recommend the length and location of the conveyor belt together with specific locations of deer crossings be delineated in more detail in the Final Environmental Impact Statement. Deer crossings should be located to an exact point so the Divison may evaluate the probability of their use by deer. The feeder conveyor section will require numerous deer crossing points. Conveyor section No. 1 has only two crossing points. At least four additional crossings should be provided for deer along this section. The number of deer crossings in conveyor sections No. 2 and 3 are considered adequate. Deer movements in the Grimes Wash area will be most concentrated between the mine portal and the end of conveyor section No. 1. Conveyor section No. 4 should have additional deer crossings to allow deer migration and daily feeding movement off Johnson Bench into adjacent agricultural areas. Conveyor section No. 5 should be provided with additional crossing sites on the west end near the junction with conveyor section No. 4.

Response: See response to Comment No. (3) above.

(5) Comment: Coal haul traffic, assuming 30 tons of coal per truck, will consist of about nine loaded trucks per hour during a 16-hour period each working day. This amounts to one loaded and one empty coal truck passing any given point along the haulage route every seven minutes of a working day that coal is hauled. The coal haul road passes through 7.5 miles of deer winter range and agriculture areas used extensively by deer. Mortality to deer resulting from collisions with coal trucks will be significantly increased considering the frequency and speed of coal truck traffic through this area.

Response: Some increase in mortality would probably occur. However, the percent increase cannot be predicted.

(6) Comment: Potable water for the plant site will be provided from the Clawson water system. The Draft Statement fails to mention the amount and types of habitats which will be disturbed while constructing the culinary waterline (page 1-74).

Response: The potable water pipe line has been constructed. The subject was discussed with personnel from UDWR. Only a small amount of acreage was temporarily disturbed (10 acres) and only minimal impacts occurred during construction.

(7) Comment: Industrial water will come from Millsite Reservoir located three miles west of Ferron, Utah. An 11 mile long pipeline will bring water to the plant site. Installation of this line will disturb 33

acres of land. Sixteen acres (48 percent) of this land are very productive as cover and food for wildlife, especially pheasants, cottontail rabbits provide marginal wildlife habitat. The pipeline will be reseeded, but an 8-foot wide access road with a dirt surface will permanently occupy 10.7 acres along the pipeline route. Habitat lost to this road should be quantified.

<u>Response</u>: This impact is quantified in Chapter 6, Section K, Land Use.

(8) <u>Comment</u>: Service roads for construction and maintenance of the transmission lines will be needed (page 1-82). Existing roadways will be used, but 40 miles of new road will be required between Wattis and Gilluly. About 20 miles of this road will be permanently maintained after construction is completed. The Draft Statement fails to identify the area in which the roadway will remain open or the number of acres and type of habitat lost temporarily or permanently due to road construction. We recommend the portion of roadway to be maintained should be restricted to Company maintenance traffic only.

<u>Response</u>: The vegetative communities affected and the acreage are identified in Table 3-8. The acreage of road that would remain open has not been identified.

(9) <u>Comment</u>: Effects that could result from subsidence are not completely evaluated in the section titled "Geology and Topography" (pages 2-25 through 2-30). No mention of potential loss of water is made in this area. If subsidence alters or eliminates waterflows from springs and seeps, serious adverse impacts on wildlife will occur. Valuable and unique vegetation communities will be lost. Livestock and wildlife will concentrate at any remaining water sources. Wildlife, especially deer and elk, will become serious competitors with livestock for a limited water resource. Ultimately, numbers of wildlife of all species will be reduced by a loss of water. Lowered numbers of game animals would ultimately result in a reduction in recreational opportunity for the public.

Description of the water resource (pages 2-41 to 2-48) illustrates that there are many seeps and springs and two lakes on East Mountain which could be affected through subsidence from mining coal. Many wildlife species rely on these water sources; some on a year-round basis. Wildlife should be considered a primary user of the water resources on East Mountain. A detailed inventory of all seeps, springs, lakes and streams including location and water quality and quantity should be developed and provided for the Statement. This information is available through the U.S. Forest Service. Evaluation of subsidence is incomplete without this base-line data.

<u>Response</u>: The loss of water as a result of subsidence occurring on East Mountain above the mine is discussed in Chapter 3, Section G, Water Resources. The impacts on wildlife are also discussed. The data on springs and seeps in the area were provided by the U.S. Forest Service as best available data.

(10) Comment: The reference on page 2-48 to Duck Lake should be changed to Duck Fork Reservoir. It should be explained, on page 2-50, that Electric Lake is a cutthroat only water. The last paragraph on this page needs to be rewritten as it is poorly done and has some errors.

Cleveland - RBT (fingerlings plus catchables)
Miller's Flat - RBT (fingerlings)
Duck Fork - Not stocked
Willow Lake - RBT (catchables)
Ferron Reservoir - RBT (catchables plus fingerlings)

Response: The paragraph has been revised.

(11) Comment: Additionally, none of the waters discussed hold brooktrout. References on page 2-51 should note that stream fluctuations are primarily a result of releases from the controlling impoundments on Lower Fish Creek, Huntington and Cottonwood Creeks. The major diversions on Hungtington and Cottonwood Creeks are well below the canyon mouth, with the useable habitat extending to the point of diversion.

Response: References to brook trout have been deleted and the text revised to reflect comments on fluctuations and diversions.

(12) Comment: Due to the inability of the stream habitat to support spawning activities as a result of siltation caused by dam and bridge construction, the Division has stocked brown fingerlings in Huntington Creek below Electric Lake for the past three years.

Response: This statement has been added to Chapter 2, Part 7, Wildlife.

(13) Comment: Data presented in the Draft indicates rangeland reseedings on disturbed areas at lower elevations will be successful in only three of every 10 years. Acreages along the higher elevations of the transmission lines apparently have greater potential for success for rangeland seedings. The Final Statement should include a tabulation of acreages for each vegetation community under each project component in table 2-7. This information would be extremely valuable in assessing re-vegetation potentials. Losses of wildlife habitat due to construction of a project component may be of significant duration if seeding success is as low as 30 percent.

Response: A tabulation of acreages for each vegetative community under each project component is included in Table 3-8. Only 349 acres would be disturbed, and of this, 143 would have less than a 30 percent chance of being reseeded. Most of this 143 acres is located on Mancos Shale that had no vegetative cover in the first place.

(14) Comment: The terrestrial wildlife resource statement that "mule deer, elk, American pronghorn antelope, upland game birds, and waterfowl are the major game species" is inadequate. Cottontail rabbits and snowshoe hare are abundant in the Primary Influence Zone. Almost every component of the project affects one or both of these game species. Cougar and bear are game species inhabiting higher elevations of the project area.

Response: Cottontail rabbits and snowshoe hare have been added to the game species listed. Cougar and bear are identified by game species. Even though these animals would be impacted, the effects would be so small as to be unmeasurable.

(15) Comment: The game habitat map (figure 2-8 [sic; actual figure is 2-18] page 2-55) is not complete. The map should be enlarged to encompass the Primary Influence Zone along with transmission line corridors and other components of the project. Wildlife habitats on the existing map are incomplete. Deer fawning and elk calving areas are not limited to the small area outlined on this map. Such areas can be identified along the entire length of the Manti.

Response: The game habitat map referred to portrays areas of game habitat that could be impacted by elements of the proposed project. Transmission corridors, as proposed, are included on the map.

It was not intended that the zone reflect wildlife habitat in the area of primary influence, which pertains only to recreational and cultural resources.

(16) Comment: Upland game habitat on the map appears to be identified only in the agricultural areas that are primarily inhabited by pheasants and doves. Areas used by Utah's two species of forest grouse, quail habitat, sage grouse habitat, and chukar habitat should be indicated.

Response: Areas of habitat of forest grouse, sage grouse, quail, and chukar would not be impacted, the areas were not included on the map. The text has been changed to indicate the areas.

(17) Comment: Waterfowl habitat is poorly labeled on the game habitat map. Huntington Creek provides year-round waterfowl habitat. Desert Lake Waterfowl Management Area is not identified on the map. Waterfowl habit from Sigurd to Camp Williams has not been identified on this map. Utah Division of Wildlife Resources publication No. 74-17 titled "Evaluation of Existing Wetland Habitat in Utah" provides detailed information on waterfowl habitat.

Response: Waterfowl habitat at Huntington Creek has been added to the game habitat map (Figure 2-18). Sevier Bridge Reservoir and Chicken Creek Reservoir have also been added to the Sigurd-Camp Williams route. Desert Lake is located outside the boundaries of the map. A discussion of this area has been added to the text.

(18) Comment: Cottontail rabbit and snowshoe hare habitats are not identified. Cougar and bear habitats are not outlined. Furbearers and muskrats are not mentioned or their habitats outlined on the map. During the 1975-76 trapping season, 14 trappers, representing 8 percent of the State's beaver trappers, harvested 132 beaver in the Carbon-Emery area, which equals 6 percent of the State's total beaver harvest by licensed trappers.

Response: Cottontail rabbits, snowshoe hare, muskrats, and other

protected furbearers would not be measurably impacted; therefore, their habitat has not been included on the map.

(19) Comment: Trapping for nonprotected wildlife - muskrats, coyote, fox, bobcat and other animals - is not discussed in the Statement. Two muskrat trappers were issued permits for the Desert Lake Waterfowl Management Area during the 1975-76 trapping season. These permits sold for a total of $70; about 300 muskrats were harvested. It is unknown how many muskrats were harvested by trappers in the remainder of the Primary Influence Zone.

Response: Impacts from the population increase due to Emery would not affect trapping in the area. See response to Comment No. (18) above. above. Regardless of the population increase in Emery County, the permits issued for trapping on Desert Lake would not increase. Bobcat are a protected species.

(20) Comment: The discussion of deer and elk on page 2-56 is not complete. The importance of the Manti (deer herd units 32, 33, 34, 35, 36A, and 36B) and Book Cliffs (deer herd units 27A and 27B) deer herds is not conveyed. These deer herd units supported 7 percent of Utah's total deer hunting trips and 7.5 percent of the deer harvested in 1975.

Response: The limits for deer and elk herd units are artificial boundaries established for management purposes. The units are useful in determining use and harvest data, and as such, were utilized in analyzing impacts.

(21) Comment: For the last two years (1974 and 1975) sales of resident deer hunting licenses have been showing negative trend. Deer license sales were 4.5 percent less in 1974 than in 1973, and 1975 sales were 2.9 percent below 1974 levels. Concurrent with this statewide decline in deer hunter license sales, a 5.2 percent increase in the number of hunter days spent on the above deer herd units occurred. We believe a significant portion of the increase resulted from the Emery Power project and, further, it is our contention that additional increases in hunting pressure will occur as project acivities are expanded.

Response: The increased hunting pressure is discussed in the Land Use sections in Chapters 3 and 6.

(22) Comment: Manti Mountain units supported 28 percent of the total hunter days in Utah's elk hunters in 1975 and provided 26 percent of the elk harvested that year.

Response: No response required.

(23) Comment: The discussion of antelope on page 2-5 is also incomplete. Only the Icelander Wash antelope herd is identifed. The San Rafael antelope herd occupies the Primary Influence Zone.

Response: The Icelander antelope herd was identified because of

its proximity to population centers and the generating complex site. Even though the San Rafael antelope herd is located within the primary influence zone, a thorough analysis failed to show probable impacts. Therefore, no identification appears in Chapter 2, Part 7, Wildlife. (See response to Comment No. (15) above.)

(24) Comment: The upland game bird discussion on page 2-56 is inadequate. Several distinct populations of sage grouse, one on Horn Mountain and others scattered from Emma Park to Scofield Reservoir, have been identified by the Division. The Emery-Spanish Fork-Camp Williams transmission line passes through habitats used during different seasons by sage grouse.

Response: See response to Comment No. (16), above.

(25) Comment: Cottontail rabbits and snowshoe hares are not considered in this Draft Statement. Cottontails are abundant and widely distributed thoughout the foothills and lower elevations of the Primary Influence Zone. Snowshoe hares are abundant and distributed throughout the coniferous type on the Manti Mountain. Several components of the project directly affect each of these species.

Response: See response to Comment No. (14) above.

(26) Comment: Statements oriented to waterfowl in Chapter Two of the Draft Statement are incorrect. Year-round use of habitats in the Primary Influence Zone has only been documented on Huntington Creek. All other areas experience a winter period when no marshland avifauna are present. Every water source in the Primary Influence Zone provides for some waterfowl use.

Response: The text has been revised to indicate that not all waters provide year-round habitat.

(27) Comment: Desert Lake Waterfowl Management Area was not described in the Draft Statement. This Management Area experienced a 20 percent increase in hunter trips and a 19 percent increase in ducks harvested from 1974 to 1975. An additional 107 trips to Desert Lake are expected due to the Emery Plant. This amounts to a 12 percent increase over numbers of hunter trips during the 1975 season. This increase is significant considering the small size of the area. Consideration has already been given to alternative management practices to regulate hunting on this area.

Response: Information concerning the Desert Lake Waterfowl Management area has been added to Chapters 2 through 5 in the sections on Wildlife.

(28) Comment: The nongame wildlife paragraph is misleading. Predators are listed as coyotes, foxes, bobcats and lions. Many wildlife species, particularly birds, prey upon each other; thus, use of the term "predator" in this limited context is not particularly appropriate. Also, lions are game animals and should be considered in the game section.

Response: The text has been revised to eliminate the word "predator." Lions have been list as game species in Chapter 2, Part 7, Wildlife.

(29) Comment: The moose release statement (page 2-56) should read ".... winters of 1973 and 1974 a total of 39 head were released . . . ." The Draft sates, "At present, their habitat is limited." That statement is accurate, but it should be noted that habitat is not currently limiting herd size. Desert bighorn sheep should also be included in the uncommon and unique species reference. A bighorn ram was observed by Division employees at the Ferron dump in 1965. Unconfirmed reports of bighorns on the San Rafael occur regularly.

Response: The text has been revised. Desert bighorn sheep have been added to the list of uncommon and unique species.

(30) Comment: The statement on page 2-57 noting, "There are no species classified as threatened, under the endangered species act, in the project area," is vague if not inaccurate. Peregrine falcons have been sighted in the Primary Influence Zone. A traditional aerie is located along the San Rafael River, and an unidentified falcon was observed within one mile of the aerie in 1976. Knowledge concerning the Peregrine falcon is lacking; a negative declaration is inappropriate.

Response: The American peregrine falcon is officially listed as "endangered." Its presence in the area was noted. No species listed as "threatened" has been identified in the area.

(31) Comment: The statement relates to only 1,700 acres of pheasant habitat in the project area. The generating complex will cause pheasant use and production to change on 2,000 acres of Utah Power and Light land 2.5 miles south of Castle Dale. Another 1,430 acres of land owned by Utah Power and Light outside the generating site will be altered due to cessation of cropland irrigation. The terrain of these areas is flat to generally rolling in nature. Change of use on this 3,430 acres owned by Utah Power and Light represents a loss of both prime and marginal pheasant habitats. Prime habitats consist of 1,831 acres of agricultural (87 percent), riparian (9 percent), and saltgrass (4 percent) covered lands. Marginal pheasant habitat includes 1,599 acres of greasewood (30 percent) and saltbush (70 percent).

Response: Loss of pheasant habitat was calculated using agricultural cropland actually retired (1,600 acres) and riparian habitat occupied (100 acres). Change of use does not necessarily represent loss of habitat. Some habitat may be improved, and the exclusion of hunters in the generating complex area would provide a limited resting area during the hunting season.

(32) Comment: The agricultural land (1,600 acres) taken out of production represents 3.5 percent of the total irrigated agricultural land in Emery County. The 1976 Utah Agricultural Statistics lists 46,295 acres of irrigated cropland in Emery County, Utah. This same figure is listed in their 1975 publication. The Draft Environmental Impact Statement (page 2-44)

indicated Emery County has 38,604 acres of irrigated cropland. The figure in the Statement should be corrected.

Response: The figure has been corrected.

(33) Comment: Numbers of pheasants and quality of habitat in the Castle Dale area are among the best in Emery County. Assuming this cropland is only average, at least 236 hunter-days of recreation will be taken from pheasant hunters each year with a loss of 243 birds harvested. Change in use on lands owned by Utah Power and Light have resulted in 195 breeding hens being displaced from their habitat. Those hens had a potential to produce 885 young annually. These estimates of pheasant losses on lands owned by Utah Power and Light for the Emery Plant should be considered minimum.

Response: The figures, similar to material previously supplied by UDWR, have been incorporated into Chapter 2, Part 7, Wildlife.

(34) Comment: Habitats inside and outside the generating complex also produce cottontail rabbits and mourning doves. Neither of these species are adequately described in Chapter Two of the statement.

Response: Mourning dove has also been added to the list. See response to Comment No. (14), above.

(35) Comment: An increased human population in Emery County will subject the dove population to additional pressures. It is not known how this will affect the dove population.

Response: A statement which clarifies this subject is included in Chapter 3, Section H, Terrestrial Wildlife.

(36) Comment: Cottontail rabbit hunters in the Carbon-Emery area accounted for 16 percent of the State's total hunting pressure on cottontails. They harvested 17 percent of Utah's total cottontail bag. Summer roadside counts show an average of 0.45 cottontails observed per mile in Carbon and Emery Counties during the last nine years. Only 0.23 cottontails per mile have been observed on summer routes the last two years. This is a 49 percent decrease from the long term average. Additional hunting pressure resulting from the Emery Project will impact upon cottontail populations, especially when they are at low points in their population cycles.

Response: See response to Comment No. (14) above.

(37) Comment: The discussion of wildlife (deer) and habitat surrounding the Wilberg Mine (page 2-58) fails to note this habitat supports not only deer, but cottontail rabbits and a wide variety on nongame wildlife species. This section should be rewritten to fully describe the wildlife resource associated with the coal source and support facilities.

Response: Only those wildlife resources that would be impacted by

the proposed action that would measurably affect the human environment have been analyzed. (See response to Comment No. (14) above.)

(38) Comment: The Draft Statement is inadequate in its discussion of wildlife and wildland habitats to be affected by the coal haul road and conveyor (page 2-58) between the mine portal and the plant site. Deer are the only wildlife described along these components of the project. Table 2-8, page 2-40, illustrates that these two project components will remove 50 acres of agricultural land, three acres of riparian land and one acre of saltgrass. This represents 54 acres of productive pheasant habitat in addition to 58 acres of greasewood and saltbrush providing marginal pheasant habitat.

The Draft Statement identifies the 15 acres of pinion-juniper to be removed by haul road and conveyor construction as important deer winter range. Losses of pheasant habitat and use of this habitat by deer (large numbers of deer utilize the agricultural areas in late winter and early spring), pheasants, doves, cottontail rabbits, raptors, and the wide variety of nongame wildlife that populate the area should be noted.

Response: Page 2-58 of the Draft indicates a variety of wildlife habitats and refers to Appendix II-3 which notes presence of rabbits, raptors, upland game, and waterfowl in addition to deer. Approximately 12 acres of agricultural land would be occupied by the coal haul road (see Chapter 8, Section F, Coal Transportation Methods). The analysis of impacts on pheasant habitat has been based upon the loss of approximately 1,700 acres, to which the addition of 12 acres would add less than 1 percent. (See response to Comment No. (37) above.)

(39) Comment: The description of habitats and the associated wildlife in the areas crossed by the power transmission lines is deficient in description. Additional data should be presented to fully evaluate effects of transmission lines and the construction and maintenance of such lines on all wildlife. Numbers of deer or elk reproductive areas (fawning and calving areas) the transmission lines will cross are not tabulated or their locations identified. Additional data classifying linear miles of wildlife habitat to be disturbed by transmission lines should be provided. This classification should include habitat types, e.g., pinion-juniper, mountainbrush and mixed conifer, together with wildlife use of a specific habitat to permit evaluation of effects from these components. Consideration should also be given to other wildlife species.

Cougar and bear inhabit some of the area to be crossed by the power lines. Sage grouse wintering areas and strutting grounds are crossed by the transmission lines. Cottontail rabbit and snowshoe hare habitat will be crossed. A Peregrine falcon was sighted on January 12, 1975 by Utah Wildlife Resources biologists in an area adjacent to the proposed power line corridor in Spanish Fork Canyon. Other nongame wildlife utilize areas to be affected by the power line corridors.

Response: Profile maps appended to the statement show the relationship of wildlife and vegetative types along all proposed transmission corridors.

A tabulution would be redundant. The sightings of the Peregrine falcon in the canyon east of Spanish Fork have been added. Many other wildlife species were not analyzed in the statement. Only those resources having impacts to such a degree as to result in a measurable effect on the "human environment" were included.

(40) Comment: The Draft Statement indicates that on company owned lands outside the generating complex Utah Power and Light will "retire crop acreage by withholding irrigation water in hope that this action will lower the water table at the generating complex" (pages 2-72 through 2-76). This area is west of the generating plant. The Draft fails to identify additional acreage owned by Utah Power and Light immediately east of the generating complex where this same action will occur (page 2-72). It should be recommended to Utah Power and Light that rangeland reseeding be initiated in all areas where irrigation will be discontinue so some benefit will accrue to upland game. Livestock grazing should also be controlled to preserve habitats for wildlife.

Response: The area east of the generating plant is part of the 2,000 acres described in Chapter 2, Section B, Existing Environment. Utah Power and Light has not made a firm proposal regarding reseeding or use of this retired cropland. Only those mitigative measures which are real, committed, and enforceable are included.

(41) Comment: The human resource section does not adequately treat the problem of housing for project families. A shortage of housing facilities has already resulted in a movement of camping trailers into the lower reaches of local canyons. Workers living in these trailers are a threat to wildlife and wildlands. Water pollution by raw sewage and an accumulation of trash along the creeks is of serious concern. Constant and daily disturbance to wildlife species inhabiting these areas will result in degradation of the wildlife resource. This problem currently exists and is directly related to the Emery plant. Therefore, a notation should be included in the Statement.

Response: This problem has been discussed in Chapter 3, Section M, Human Resources. Investigations by BLM personnel revealed that several people were camping on BLM and private lands in Huntington Canyon for lack of housing. Of 27 trailer units parked on BLM lands, only one was owned by a construction worker from the Emery plant. The remaining 26 were owned by workers from other energy-related projects. Action was taken to evict the campers. No campers are known to be in the lower canyon area at present.

(42) Comment: The discussion of quality of life in the project area on page 2-88 should point out that people in this area are keenly interested in hunting and fishing. A public opinion survey of Utah residents, proportionally distributed throughout the State, was conducted by the Bureau of Government and Opinion Research at Utah State University in Logan, Utah, during 1974. That survey revealed 91 percent of Utah residents felt that the present level of wildlife habitat should be maintained. The question to increase habitat was not asked, but 4.4

percent volunteered by the comment that habitat should be increased. Other data are included in the survey report which note the significance of hunting and fishing to Utah citizens and suggest the role fish and wildlife play in their quality of life.

Response: The ES recognizes that hunting and fishing experiences are important to quality of life in the project area and that such experiences would probably deteriorate. Areas expressly mentioned are deer hunting, fishing, and waterfowl hunting in the Desert Lake area. The analysis can be found in Chapters 2 through 6 under the Wildlife and Land Use sections.

In a study by Brigham Young University (Albrecht, 1976), 25 percent of persons sampled regarded good recreational opportunities (hunting, fishing, etc.) as being a positive characteristic of Carbon and Emery counties. Sixteen percent of the same sample indicated, when asked to rate selected community characteristics in Carbon and Emery counties, recreational opportunities as excellent. Of those who thought recreational opportunities were something less, 30.5 percent said good, 26.3 percent fair, and 26.8 percent said poor. Based on this survey, the section on Quality of Life has not been revised.

(43) Comment: The projection that refers to the wildlife resource on page 2-98 should indicate known data and trends. From the standpoint of illegal activity alone, we can identify a trend that has an will continue to reduce the quality and quantity of the wildlife resource. Numbers of wildlife citations issued in the Southeastern Region of Utah has increased 180 percent between 1968 and 1975. To demonstrate the current trend in numbers of violations, citations issued during 1974 and 1975 increased 26 and 48 percent over the respective previous year.

The number of wildlife citations issued in the Carbon-Emery area have increased 41 percent from 1973 (105 citations) to (1975) (148 citations). Figures for 1975 are not yet available, but a significant increase in violations is known to have occurred.

Response: Chapter 6, Section L, Land Use, has been revised to include data on trends of illegal activity.

(44) Comment: Some of the aquatic habitat discussion on page 3-45 should be modifed or strengthened. Length of the average fishing day is calculated at 3 1/2 hours, and a catch rate not to exceed one fish per hour is the Division's standard for success. Based on these figures, the increased human population resulting from the project will create a demand for 28,000 additional fish. The statement leads one to believe there are currently fish being stocked to cover the projected need. We recommend not using the word "catchable" as it implies a hatchery type product. The statement about reducing game fish numbers is incorrect as we will control the numbers of game fish through stocking based on demand.

Response: Data have been used from "The Fisheries Management Survey, 1973" in consultation with UDWR (Arnold Bangerter). The word "catchable" has been removed in one instance. The statement concerning reduction in fish numbers has been clarified.

(45) Comment: We are unable to locate any comment in the Statement concerning the adverse effect that reducing the volume of water in Millsite Reservoir will have on that fishery. This is an important impact and recognition should be made of it in the Statement.

Response: The 7,000 acre-feet that would be used annually represents a change in use, not a new appropriation. This may benefit the fishery since the water would be taken out over a 12-month period instead of over the shorter 7-month irrigational season (see Chapter 3, Section L, Land Use).

(46) Comment: The statement presented on page 3-47 that "Although the additional number of people in the area would adversely affect the wildlife species and their habitat, the increase would be only a minor increment to the total increases that would occur by 1981 in Carbon and Emery Counties" is misleading. We believe the increase will result in major impacts.

Response: Impacts from the estimated 12 percent increase in population due to Emery would undoubtedly have an effect. However, unless otherwise indicated, the effects cannot be quantified.

(47) Comment: The statement indicates, on page 3-48, that 100 acres of riparian habitat would be lost through retirement of land inside and outside the generating complex. This is inaccurate. Data in Table 2-8, page 2-40 shows 165 acres.

Response: The total amount of riparian habitat in the generating complex site is 165 acres, as indicated. The 100 acres referred to would be occupied by structures at the plant site itself. The remaining 65 acres would remain in the present state.

(48) Comment: The acreage of deer habitat and numbers of deer affected by the project shown on pages 3-48 and 3-49 are in error. The Draft Statement reports that only 32 acres of deer habitat would be destroyed through construction of the coal conveyor, coal storage facilities, coal haul road and development at the mine. Table 2-8, page 2-40, shows 47 acres of pinion-juniper alone will be lost. All other habitat identified supports deer; thus, 159 acres and not 32 will be lost from these activities. These figures should be added to the 520 acres affected along the Grimes Wash, and the loss of 55 deer adjusted to equal 68 deer.

Response: Table 2-8 refers to acres of vegetative types present in the immediate area of the component. The 32-acre figure (now 100 as a result of the changes in the mining plan) refers to the area actually occupied by the coal mining surface facilities (see Table 3-8).

(49) Comment: The discussion relating to human disturbances affecting wildlife states that habitat will be lost as a result of increased numbers of people. Another factor which is not evaluated is the direct impact increasing numbers of people have on wildlife; i.e., habitat may not be destroyed, but human disturbances cause displacement of wildlife.

Response: The impact on wildlife due to human disturbance is discussed in Chapter 3, Section H, Terrestrial Wildlife.

(50) Comment: The discussion of subsidence and the potential of drying up springs on East Mountain on page 3-68 fails to recognize wildlife as a major use of those water sources.

Response: The impact to wildlife due to effects of subsidence on water resources has been added to Chapter 3, Section H, Terrestrial Wildlife.

(51) Comment: All of the comments relating to wildlife in Chapter Five should be altered to reflect comments made earlier.

Response: Where appropriate, changes have been made.

(52) Comment: There is no indication in this chapter (5) that ORV use will adversely affect wildlife.

Response: The increased ORV use that would occur could adversely affect wildlife. The impacts due to harassment, but not specifically related to ORV use alone, are discussed in Chapter 3 Land Use, Wildlife Soils, and Vegetation. Implementation of management plans for ORV use on national resource lands may prevent some impacts to wildlife. Impacts to wildlife from ORV use is not measurable and appears to be light. Therefore, this discussion has not been carried into subsequent chapters.

(53) Comment: The Draft Statement constantly refers to effects lasting the life of the Project. Animal behavior and patterns of use by wildlife that are altered or affected for 35-40 years will not be readily overcome. Such impacts may be permanent unless the area was completely restored to its original condition upon abandonment of the project site and facilities.

Response: Impacts to animal behavior and patterns have not been identified.

(54) Comment: Irreversible and Irretrievable Effects, Chapter Seven All statements referencing wildlife should be corrected to reflect our earlier comments.

Response: Revisions have been made where appropriate.

(55) Comment: The Draft Statement as it describes the existing wildlife resources and habitats and the effects of the generating complex and its components on those resources is poorly presented. The position is taken that effects from the Emery Plant will represent only a small portion of what the energy industry will bring to the Carbon-Emery area. The Emery Project Environmental Impact Statement should relate specifically to impacts from this project. The population of Carbon and Emery Counties was estimated at 26,000 people (page 2-80) in 1975. The Draft (page 3-70) indicates that 1,165 people are currently residing in the Carbon-Emery area as a result of the Emery Project. This is a 4.5 percent increase over the 1975 population level. The total population added to

the Carbon-Emery area due to the Emery Plant will be 4,512 people by 1981. This equals a 17.4 percent increase over the 1975 population due to the Emery Plant alone. We would recognize this as a significant increase.

Realizing that other energy industry will cause about a 6 percent per year increase in population exclusive of the Emery Plant, the Carbon-Emery population will increase 42 percent from 26,000 in 1975 to about 36,881 people in 1981; with this increase, plus the increase from the Emery Plant, the population in 1981 will equal 41,393 people; a 59 percent increase over the 1975 population. The Carbon-Emery area will increase in population with or without the Emery Plant. However, the influence of the Emery Plant alone is significant.

Response: See response to Comment No. (46) above.

ii. Environmental Defense Fund, Mary Belle Bloch (Letter No. 35)

(1) Comment: Appendix I-7 (pp. 1-119 ff.) - Rationale for Average and Worst Grade Coal Analysis to be Used for Emission Rate Source Terms

To consider a coal that is 0.54% sulfur and 11,719 Btu/lb. as an average coal from the Hiawatha Bed is in error. Similarly, to consider a coal with 0.58% sulfur and 11,298 Btu/lb. as worst coal is also in error. Accordingly, the calculations of emissions resulting from the burning of said worst coal quality are inaccurate.

Table I-7-1 shows analysis of coal from mines on the Hiawatha Seam and reports a range of sulfur content of 0.5 - 1.2% with an average of 0.67%; and the range of Btu/lb. of 10,880 - 12,930 with an average of 12,379. Table I-7-2 shows the range of sulfur content in Hiawatha Coal as 0.31% - 1.5% with an average of 0.67% and the range of Btu/lb. as 11,660 - 13,274 with an average of 12,448. On the other hand, Table I-7-3 which shows the coal analysis data for the Hiawatha Bed, Wilberg Mine, that will be supplying the Emery Power Plant shows a range in sulfur content of 0.4% - 0.9% with an average of 0.62%. The rationale for determining worst coal was based on Table I-7-6 which also shows that coal received on 9/10/75 had 0.6% sulfur and coal received on 12/26/75 had a Btu/lb. value of 10,446.

In order to realistically determine emission rates, worst coal should be one with 0.7% sulfur and 10,500 Btu/lb. Such coal would result in much higher emissions than the assumed worst coal (0.58% sulfur and 11,298 Btu). It is unheard of to take a low average sulfur content to start with and add one standard deviation to it to arrive at worst coal quality. It is a known fact that a coal seam is never homogenous throughout and that there are wide variations in composition both vertically and laterally. It is also interesting to note that a coal with 0.72% sulfur and 10,500 Btu/lb. (which exists in the Hiawatha Seam and the Wilberg Mine according to Table I-7-2 and I-7-3) would violate the Federal and State emission standard for SO_2 (1.2 lb./million Btu).

Response: Analysis of emissions was based on the average worst-grade coal, not the worst-grade coal that might be obtained from the coal source. The approach used for determining worst-grade coal is a

common statistical approach for defining limits. Assuming a normal distribution for coal samples collected, the average sample value plus or minus one standard deviation will contain 68 percent of all the sulfur concentrations in samples collected. This approach was discussed with EPA and UP&L. Both felt that it was a reasonable approach for defining worst-grade coal.

(2) Comment: Trace Elements in Coal

No analysis of the coal in the Wilberg mine was made for trace elements. To infer that the analysis of coal from the nearby Deseret Mine and other mines in the Hiawatha Seam is comparable to results expected from the Wilberg Mine coal is grossly in error. Wide variations in trace elements in coal seams are the general rule with enrichment near the bottom of a seam and in some cases at the top as well.

Response: The analysis was based on trace element concentrations in the same seam of coal. These elements are called trace elements because they exist in small quantities. Variations in the low parts per million ranges would not make a significant change in what is emitted from the stack. Thus, a correlation can be made between trace elements from the Deseret and Wilberg mines.

(3) Comment: Coal Quantity

Eighty-four million tons of coal would be the predicted maximum used during the projected 35-year economic plant life (pp. 1-55). The annual consumption range is 1.6 to 2.4 million tons (pp. 1-56). In traditional room and pillar operations, 50% of the coal resource can be recovered. It is unrealistic to estimate 70% recovery. The DEIS states that 70 million tons exists in the Hiawatha bed within the Wilberg mine (pp. 1-58, 2-69) for use at the Emery plant. Where is the additional coal resource? Can all the permits be granted for operation of a steam electric plant be given if sufficient coal reserves for the projected life of the plant are not identified? How much coal is expected to be mined out of the Wilberg mine? The calculations as to the specific quantity of coal which will be mined out of the Wilberg mine vary. There are two conflicting statements:

> "There is no practical means by which the subsidence could be mitigated on 4,658 acres of land above the Wilberg Mine as an estimated 57 percent of that coal is removed." (pp. 4-11)
>
> "Subsidence may occur on 4,658 acres of land above the Wilberg mine as an estimated 70 percent of the coal is removed." (pp. 5-7)

The Deer Creek mine is listed as an alternate coal source (pp. 8-141, 8-142). What is the estimated reserve in this mine adjacent to the Wilberg Mine? Is this resource presently under lease to UP & L or Peabody? Are there any private leases within this coal lease area? How much of the Deer Creek mine resource would be available for use at the Emery plant?

The quantity of coal available from the alternative sources is unknown. Estimated recoverable coal figures are stated in Figure 8-26 (pp. 8-14). Does any more accurate information exist?

Response: The mining plan has been changed. Estimated coal

recovery would be 50 percent. With the change in the mining plan, both the Hiawatha and Bear Canyon coal seams of the Wilberg lease would be mined. There is sufficient coal in the two seams to provide for operation during the life of the plant.

Coal reserves from Deer Creek Mine are discussed in Chapter 8, Section D, Coal Sources (also see Figure 8-26). The Deer Creek Mine is owned by Peabody Coal Company; coal from this mine is currently used at the Huntington plant. There is sufficient coal in the Deer Creek Mine to supply coal for operation of two units at both the Huntington and Emery plants.

The estimated recoverable coal figures are the most accurate figures currently available.

(4) Comment: We support the position of the Environmental Protection Agency (EPA) as stated in the March 10, 1976 letter from John A. Green to Mr. Verl R. Topham (Appendix VIII-4). To allow UP & L to eliminate scrubbers from the two steam electric units at Emery would significantly increase the SO_2 emission rate. The data presented in the Appendix (VIII-3, VIII-4) should be presented in the main body of the Emery environmental impact statement.

Response: As lead agency, the BLM has analyzed the proposal from the applicant. Since scrubbers were not included in the proposal, they were not included in Chapters 1 through 7. Chapter 8, Section C, Alternative Plant Design and Operating Methods, which discusses the scrubber alternative in depth. (See response to Comment No. (5) Letter 27.

(5) Comment: What are the effects of subsidence on the aquatic and terrestrial wildlife in the vicinity of the potential mining areas? Four thousand, six hundred and fifty-eight acres may be directly impacted. "The actual surface area affected by subsidence would extend beyond the coal lease area" (pp. 3-30). In addition, "Subsidence could affect soils, land use, water resources, and human safety" (pp. 3-31). These are insufficient statements as to the impacts of subsidence. Possible effects on the 50 mammal species, 245 bird species, 20 species of fish and 33 species of reptiles and amphibians (pp. 2-56) should be identified. To state that only 552 acres of deer winter range . . . adjacent to the Wilberg mine would be lost (pp. 3-49) is unrealistic since subsidence could directly impact at least 4,658 acres. This section needs to be clarified and the real impacts identified.

Response: The effects of subsidence upon land use, water resources, and human health and safety are discussed in these sections of Chapter 3. Chapter 3 also discusses the impacts of subsidence on wildlife as a result of springs drying up.

The 552-acre figure has been changed to 620 acres due to changes in the mining plan. The acreage refers to the area affected by the feeder coal conveyor and mining operation.

(6) Comment: The alternatives section discusses two modifications of the Spanish Fork - Camp Williams proposed transmission line routes but there is little discussion of the proposals in the Provo area.

What is the specific route through Provo? A proposed route through a city as large as Provo (200,000 by 1980) should be specifically identified. The reader of this D-EIS has only a small scale map (pp. I-80), several profile maps (pp. 2-113, 2-115, 2-117, 3-97), and one paragraph of text (pp. 3-69) available to identify the specific route. UP & L has proposed three routes in the Provo area. How many existing and planned residential homes will be affected along each route? How much acreage will be impacted by each of the routes?

Response: A discussion (including maps) of the proposed and alternative routes in the Provo area has been added.

(7) Comment: What background data exists to support the following? "About 75 percent of the plant operators and miners would probably live in Price and Helper. Most of the remaining 25 percent would probably live in Huntington, Castle Dale, Ferron, and Orangeville" (pp. 3-81). This statement might be correct during the early construction stage, but most workers will favor living closer to their work location as soon as housing is available. It cannot be assumed that future settlement patterns will follow the current pattern. Presently 50% of the construction workers live in Price or Helper with 30 to 40% living in Huntington, Castle Dale, Ferron and Orangeville (pp. 3-71, 3-72).

Response: The figures were derived using standard distance-decay models. Projections were made by a consulting firm. The complete report is listed in the references under VTN (Voorheis, Trindle, and Nelson) 1975.

The figures referred to on Pages 3-71 and 3-72 of the DES were incorrect and have been corrected to read 50:50.

(8) Comment: How can the percent change in unemployment in Carbon County, Emery County and the state be known for 1976 when we are still in the 1976 calendar year? Figure 3-13 (pp. 3-76) should be revised. What is the source for the data presented in Table 3-15 (pp. 3-78), Projected Income from Emery Power Generating Plant? Also, how is the income multiplier figured for this table?

Response: Employment data are computed on a monthly, quarterly, and annual basis. The data in Table 3-13 are for the early months of 1976. The data in Table 3-15 have been corrected and recomputed. The final figure is calculated by multiplying the number of workers by the annual salary. This product is then multiplied by the multiplier; the product is total income for a given time. The multiplier was obtained from Utah Economic and Business Review, July-August, 1967. The calculation to determine the multipliers can be found therein.

(9) Comment: It is stated that, "Future energy development could bring $2 and $7 million in additional taxes by 1985 to Carbon and Emery Counties, respectively" (pp. 3-78). What is the distribution of these taxes? What proportion of these taxes come from Capital expansion? What are the front end costs which Emery and Carbon Counties will have to provide? How do the fertility rates used compare with the national average family size of 3.5 persons (Table 3-11, footnote c).

Response: It is not evident that the suggested detailed information would aid in the evaluation and mitigation of impacts. Consultation with the Southeastern Utah Council of Governments revealed that the future distribution of monies, as well as those taxes generated from capital expansion, is not known. Table 3-16, which has been added, depicts projected front end costs.

According to the 1970 census, the average family size for the U.S. is 3.2, but for Utah is 3.49. The footnote has been changed to read "... the state average of 3.5 persons."

(10) Comment: Congress has recently enacted legislation which should be identified in the alternatives section. The Energy Conservation and Production Revenue act of 1976 was enacted in August 1976.

Response: See response to Comment No. (7) Letter 31.

jj. Thomas V. Kalkie, United States Department of the Interior, Bureau of Mines (Letter No. 36)

No response required.

kk. John A. Green, United States Environmental Protection Agency, Region VIII (Letter No. 37)

(1) Comment: A basic issue that should have been more completely analyzed in the EIS is the amount of additional electrical generating capacity that will actually be needed in the UP&L service area in the future, and when it would be necessary to have this generating capacity on-line. UP&L's projected annual growth rate of 9.1-10.4 percent appears to be highly excessive in light of the demonstrated need to conserve our energy resources. A lower, more reasonable growth rate would not require the urgency presently being expressed by UP&L for the development of the electrical generation capacity. EPA recommends that an independent demand study be made for the UP&L service area, and that the results of this study be presented in the final EIS. This independent demand study would also be necessary for evaluating future projects proposed by UP&L.

Response: The BLM appreciates the concerns expressed by EPA in its review of the Emery DES. However, BLM does not agree with the conclusion that an independent demand study for the UP&L service area be made a part of the FES. The BLM objective in preparing an ES, as stated in the BLM Manual 1972, "is to disclose to the public and the decisionmakers the probable environmental impacts of the proposed Federal action and the alternatives, and to assure that these factors are considered along with economic, technical, and other considerations in the Bureau's decision-making process." The BLM believes this is consistent with the intent of NEPA.

In regard to the Emery project specifically, it is BLM's position that the justification of need for additional electricity has been established by the Utah Public Service Comission at hearings conducted November 5 and 6, 1975.

The BLM has no reason to question the projections for electrical power needs approved by the Utah PSC. However, if the EPA has information indicating that the electrical demand projections presented at the hearings before the Utah Public Service Commission do not represent an accurate projection, EPS is urged to communicate this information to the Utah PSC and to BLM. The BLM will be pleased to consider any additional material in this regard as a part of our decisionmaking process for this proposal. See Response to Comment No. 1, Letter No. 15.

(2) Comment: Considering the amount of development proposed for this part of Utah, there appears to be a critical lack of planning in several areas. One of these being off-road vehicle (ORV) use, and this is an area where adequate planning by federal land management agencies is important. The impact statement indicated that no planning has been done for the anticipated increase in ORV use. EPA believes it is important that such planning be accomplished as soon as possible. Off-road vehicles could cause considerable resource damage that could greatly increase erosion, and the visual impact of ORV use in the San Rafael Swell area could be considerable.

Response: The BLM is presently considering classification of all lands under their jurisdiction to include management plans for ORV use.

(3) Comment: The failure to adequately analyze the impacts of the proposed Emery-Spanish Fork-Camp Williams transmission line as it passes the Provo area is a major omission in the impact statement. A transmission corridor through an urban area could have significant impact, and the impact should be adequately analyzed. EPA recommends that the analysis for transmission line should include a complete discussion of possible effects upon health (physiological and psychological) caused by extended exposure to high-level electric fields. This discussion should include the results of the latest research conducted in this area. The expected impact to radio and television reception for residents near transmission lines should also be included in the analysis.

Response: A complete discussion of the impacts of the transmission line in the Provo area can be found in applicable sections of Chapters 2 through 7.

(4) Comment: The text on page 2-18 does not agree with Table 2-3 regarding particulates. The table shows no violations of the 24-hour ambient standards while the text indicates 16 violations of the primary standard and 51 violations of the secondary standard.

Response: Table 2-3 shows average 24-hour particulate concentrations for 1970 and 1971. The table does not show the 16 violations of the primary standard or the 51 violations of the secondard standard, although the text explains these violations.

(5) Comment: On page 2-22, the daily concentrations of particulates around Emery need to be presented. Monthly concentrations are unrelated to national standards.

Response: The measurements referenced were taken from July through

September 1974. The concentration is stated in the form of a geometric mean and can therefore be compared to the annual standard. The text has been changed to indicate when the samples were collected.

(6) Comment: Page 3-11. Table 3-1 gives emission rates and emission standards. Table 3-2 gives NAAQS. Table 3-1 is not referred to in the text, and Table 3-2 is wrongly referred to.

Response: Portions of Chapter 3, Section C, Air Quality, have been revised; the recommended changes have been made.

(7) Comment: Page 3-14. Table 3-3 should be 2.5 m/sec for wind speed.

Response: The figure has been corrected.

(8) Comment: Page 3-15. The "d" footnote is placed only on particulate estimates, but refers to SO_2 and particulates. The 71 tons/day SO_2 emission rate is less than either 83 tons/day for average grade coal, or 92 tons/day for worst grade coal. If the 71 tons/day emission rate is increased for short-term dispersion estimates to 92 tons/day, the VTN estimate of 1000 $\mu g/m^3$ becomes 1310 $\mu g/m^3$, which is above the 3-hour standard. BLM estimates would be changed from 928 $\mu g/m^3$ to 1215 $\mu g/m^3$, which is very close to the standard. The particulate emission rate given in Table 3-4 is not consistent with Table 3-1 either.

Response: Table 3-4 has been changed to clarify the emission rates for SO_2 and particulates as used by the various modeling consultants and BLM. The inconsistency in Table 3-1 and 3-4 has been clarified by the changes.

(9) Comment: If the source does not put SO_2 control on, then the most restrictive standards will be based on PSD regulations, and the percentages quoted in the last column of Table 3-4 are incorrect. They are also incorrect if the 71 tons/day emission rate was used to make the estimates.

Response: Table 3-4 has been clarified to show each of the source terms used in the four independent modeling calculations.

(10) Comment: Table 3-4 does not agree with the text on page 3-16 regarding the maximum 24-hour concentrations of SO_2. The table, which is referenced in other sections of the statement, needs to be corrected.

Response: The text has been revised.

(11) Comment: Page 3-16. The highest predicted 3-hour concentrations determined by C9M3D for interaction with elevated terrain were scaled to 24-hour estimates. The model is set up to give 24-hour estimates initally, and if any scaling were to be done, it would be from 24-hour to 3-hour; unless the model was modified to give 3-hour estimates. If it was modified, an explanation should be given.

Response: The text has been revised.

(12) Comment: Page 4-11. In the section on Climate and Air Quality, the statement is made that no practical means exists by which to mitigate the addition of air pollutants, including SO_2, NO_x, particulates, trace elements, etc. The EIS should clarify how the determination was made that controlling SO_2 was not practical, because other utility companies are planning SO_2 control on their facilities.

Response: The BLM has evaluated the applicant's proposal as it was submitted by UP&L (without scrubbers). There are no known measures for mitigating pollutants after they are emitted from a stack. The alternative of using scrubbers has been discussed in Chapter 8, Section C, Alternative Plant Design and Operating Methods.

(13) Comment: Page 5-4. If the emisison rates quoted here are applied to the results in Table 3-4, which are based on a lower emission rate, the conclusions may be different.

Response: Table 3-4 has been revised to indicate emission rates used for each calculation. The emission rates referred to were used in the BLM calculations in Table 3-4.

(14) Comment: Page 8-8. The second sentence of the last paragraph is not stated correctly. The 80% control is not required by PSD. However, if the facility is constructed not to include 80% control, as the permit to construct specified, then PSD will apply.

Response: The text has been changed.

(15) Comment: Page 8-129. The footnotes at the bottom of Table 8-25 indicate that the same diffusion model was used by NAWC, VTN, and BLM, and the difference in concentration estimates results from different assumed source terms. However, in other parts of the EIS it appears that BLM used the EPA C9M3D Valley Model, and VTN and NAWC did not use this model. This inconsistency needs to be clarified. Also, in Table 8-25 the three diffusion modeling results show that the source would be in compliance with the National Ambient Air Quality Standards. However, it is not clear which emissions rates (71 tons/day, 83 tons/day, or 92 tons/day) were used. As pointed out in the comments above, referring to page 3-15, compliance with the 3-hour standard would be marginal. All three results show that the Class II PSD increments would be exceeded.

Response: Footnote is correct; the three studies indicated used the same model. Figures in Table 8-25 were taken from Table 3-4 which has been revised to indicate which emission rates were used.

The three studies indicate Class II PSDR increments would be exceeded.

(16) Comment: The EIS did not consider the potential impact of peak-load pricing or load management on the demand for generating capacity. Such an omission is significant since experience in Europe over the last ten years has shown that peak-load pricing can motivate consumers to change their consumption patterns. While the European experience is not

directly applicable to the U.S., preliminary results from an FEA-sponsored study in Vermont show that certain peak-load pricing incentives caused residential consumers to shift their peak electricity use from mid-morning to late evening, 'thereby reducing the overall peak demand for the system. 1/ Also, preliminary results from an ongoing 1-million-dollar peak-load pricing study by the Electric Power Research Institute (EPRI) show that a 10 percent increase in the price of electricity during peak hours may result in a 2 to 3 percent decline in peak demand. The EPRI study is expected to produce final results by the end of the year on the cost, feasibility, and potential impact of peak-load pricing.

Response: A discussion on peak-load pricing has been added to Chapter 8, Section L, Delay.

(17) Comment: The EIS did not address the cost of feasibility of delaying the need for the Emery plant by accepting a lower level of reliability. However, a recent study on the economics of alternative levels of reliability for electric power generation 2/ concludes that the present one-day-in-ten-years loss of load probability criterion is too conservative and the consummer in the U.S. is probably incurring costs many times greater than the value of the electricity produced from the incremental kilowatt of capacity. The study also concludes that it would be possible for the U.S. to reduce the reliability target levels to a five-day-in-ten-year criterion without seriously affecting the quality service as perceived by most consumers. This conclusion is supported by data that shows that only a handful of loss of load incidents reported under FPC order 331-1 have been a result of insufficient generating capacity, as contrasted to distribution or transmission system failures. It is also important to point out that, according to the previously-mentioned article, the U.S. seems to have had the highest electric service reliability experience (i.e., lowest experience of loss of load) in the world.

Response: As a member of the Western Systems Coordinating Council, UP&L has agreed to maintain a 20 percent reserve capacity and a 1 day in 10 years reliability rate. Due to increased costs of supplying electrical power, these standards may change. Impacts would result from delay of the Emery proposal (see Chapter 8, Section M, No action).

The reliability or reserve of a generating system is a matter of judgement, and if people are willing to endure a higher frequency of power outage, a lower level of reliability can be maintained. The higher the reliability of a system, the higher the cost per kilowatt.

(18) Comment: The discussion in the EIS on solar energy needs to be expanded considerably, and it should reflect the current status of research and development programs and the existing availability of solar energy hardware. The EIS is misleading in indicating that harnessing solar energy is strictly in an experimental stage and that widespread utilization would not be practical in the near future.

Heating hot water electrically for domestic use represents a significant portion of the load on a power plant. However, hot water heaters utilizing solar energy have been commercially available for decades, and the widespread use of these solar water heaters could

considerably reduce the demand for electricity.

Response: A complete discussion of solar energy is beyond the scope of this ES. However, the referenced study (University of Oklahoma, 1975) contains a more complete analysis of this energy source. Also see response to Comment No. (6) Letter 17.

(19) Comment: The EIS implies inaccurately that the use of solar energy for space heating and cooling is only in the experimental state. The manufactured hardware for solar space heating and cooling is available commercially from a number of companies. A rapidly growing number of residences, commercial buildings, and schools are being built to utilize solar energy on a non-experimental basis. Utilizing solar energy for space heating and cooling in all new construction would substantially reduce the demand for additional electrical generating capacity.

Response: Utilization of solar energy for space heating and cooling in all new construction would substantially reduce the demand for additional electrical generating capacity. It was not intended to imply that the use of solar energy was in the experimental stage; however it must be pointed out that large scale utilization of direct thermal conversion is not presently taking place.

As pointed out in response to Comment No. (18) Letter 37, electric power utilities must maintain the spinning reserve to provide electricity during days or seasons when solar energy cannot be received. Until solar energy is economically competitive, conversion to this source of energy will not take place. Consequently, solar energy cannot be considered as a viable substitute to utility-generated power. (See response to Comment No. (6) Letter 17.

(20) Comment: Steam-cycle conversion plants for large-scale electricity generation are in the research and development stage. However, a prototype plant is being constructed in Albuquerque, New Mexico, and industry researchers working under government contract feel that the technology exists for commercial use of such plants, and at a competitive price.

Response: Steam-cycle conversion plants are in the research and development stage and cannot be considered a viable alternative to a coal-fired power plant, at the present time.

11. Louis S. Wall, Advisory Council on Historic Preservation (Letter No. 38)

(1) Comment: This is in response to your request of August 6, 1976 for comments on the draft environmental statement (DES) for the Emery Power Plant, Emery County, Utah. Pursuant to its responsibilities under Section 102(2)(c) of the National Environmental Policy Act of 1969 the Advisory Council on Historic Preservation has determined that this DES demonstrates compliance with Section 106 of the National Historic Preservation Act of 1966, prior to amendment on September 28, 1976 (PL 94-422), but that it is inadequate because it does not demonstrate compliance with the provisions of Executive Order 11593, "Protection and Enhancement of

the Cultural Environment" of May 13, 1971, with regard to this proposed undertaking.

As part of its planning process the Bureau of Land Management (BLM) should arrange to have the areas to be impacted by the proposed undertaking surveyed to identify cultural properties eligible for inclusion in the National Register of Historic Places pursuant to Executive Order 11593, "Protection and Enhancement of the Cultural Environment of May 13, 1971 and Section 106 as amended, in accordance with the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800). After the survey is complete the BLM should consult the Utah State Historic Preservation Officer to determine whether any property included in or eligible for inclusion in the National Register will be affected by the proposed undertaking. If such a property will be affected and the project cannot be redesigned to avoid that effect, then the BLM is required to afford the Council an opportunity to comment on the undertaking in accordance with the "Procedures."

Subsequently, the final environmental statement prepared for the undertaking should assess its impact on extant historic and cultural resources. If any of these properties are eligible for inclusion in the National Register the environmental documentation should demonstrate contact with the Council pursuant to the steps detailed in the "Procedures" and include a copy of the Council's comments.

Response: Dr. Dale L. Berge under contract with UP&L has conducted an intensive survey along each proposed transmission line right-of-way. This new information included in Chapters 2 and 3 in the section on Archaelogy. Dr. Berge found seven sites potentially eligible for nomination to the National Register of Historic Places. (See Appendix VI-3, VI-4, and VI-5). Stringent mitigating measures (See Chapter 4, Section B, Measures Required of the Applicant by Federal Agencies, No. 20.) will be taken if the proposal is approved to protect these sites. The State Historic Preservation Officer has been contacted and provided comments and concurrence (See Appendix I-8).

mm. P. M. Rees, United States Department of Agriculture, U.S. Forest Service (Letter No. 39)

(1) Comment: Pg. 1-65-6 Coal Transportation System

Propose to fence haul road by 42" fence w/36" woven wire and 2 barbed on top.

Deer crossing will be very difficult over fence. Drop use of 32" woven wire (at least on N.F.) and substitute barbed wire. Bottom wire should be 16" from ground level.

Response: The coal haul road would not cross National Forest lands. The fence, which would use 32-inch woven-wire, meets BLM standards for fencing in game areas.

(2) Comment: Pg. 1-70-b Coal Conveyor - (2) Description

It is very questionable that deer will cross under the conveyor when it is running. The conveyor makes so much noise that they will probably be frightened away. The present conveyor which runs from Deer

Creek Mine to the Huntington Plant does not show that deer are passing under. We suggest tests be made or a literature search be made to determine what type of crossing will work.

Response: The applicant's primary proposal is to haul coal to the plant by truck. Use of a coal conveyor is analyzed in Chapter 8, Section F, Coal Transportation Methods. Elevated sections of the conveyor are discussed as possible deer crossings. Noise from the conveyor at the Huntington Plant is minimal. Members of the team have actually observed where deer have passed under the conveyor belt. Heavy browsing within 6 feet of the Huntington conveyor has been observed.

(3) Comment: Pg. 1-95 (Monitoring Program - Water Quality Monitoring)
Water Quality Monitoring by UP&L (or Peabody) should be required at Grimes Wash below Wilberg Mine.

Response: There may be some concern principly because of water runoff from the coal storage area. These concentrations will be monitored as required by EPA as part of Section 208 of the Federal Water Quality Pollution Control Act.

(4) Comment: Pg. 2-75 - Table 2-13 Land Use & Ownership
This table is not accurate. Under Coal Source, footnote b says, "The surface area above the mine is 4,658 acres of Forest Service land only." This is an incorrect figure. Approximately 2,080 surface acres are owned by 3 private owners above the Wilberg Coal Lease and the balance by F.S.

Response: The footnote has been corrected.

(5) Comment: Pg. 3-30 D-Geology and Topography
1) Move site. Suggest this section be redone. Analysis of of impacts as follows should be included:

A. Impact of subsidence on private and N.F. land
   1. Water - springs decreasing or disappearing.
   2. Uses such as grazing and wildlife decreasing.
   3. Remuneration to private and N.F. for loss of value of capital improvements - fences, water developments, revegetation projects, summer home sites.
   4. Utah P&L 345 kV transmission line is located directly over an area that is estimated to drop 4 to 10 feet. Line may have to be relocated.
   5. Several National Forest grazing permittees who used the area prior to the establishment of coal leases may be put out of business if springs disappear and land becomes unsafe to use.
   6. Accelerated erosion may occur depending on severity of subsidence.

Response: Essects of Subsidence on water is discussed in Chapters 3 and 5 under Water Resources and Land Use.
Grazing is discussed in Chapters 3 and 5 under Land Use. The

impacts on wildlife are also discussed.

Remuneration is a matter between the applicant and the landowner. The applicant has made no firm commitments to mitigate the problem. These impacts were not analyzed because of insufficient data.

There are no plans for a 345-kV transmission line located over the Wilberg lease.

Subsidence, as it has occurred over the Winter Quarters Mine has not created accelerated erosion.

(6) Comment: Chapter 1: Section D.8, pages, 1-78 to 1-85. This section describes access and construction activities for the transmission lines. It implies that no new access roads would be constructed on the National Forest in Spanish Fork Canyon. We hope this would be the case; but in referencing the proposed line location, this does not appear realistic. The equipment listed in Table I-II does not include a helicopter which would be necessary to erect towers on steep areas with no present access. This is particularly important in the canyon below Diamond Fork.

We are confused by this section of the proposal and feel it should be clarified. Construction activities and access should be more accurately described as they relate to National Forest land. There will be tower sites in lower Spanish Fork Canyon that will require helicopter installation.

Response: The applicant's proposal is not to construct new access roads into Spanish Fork Canyon. A helicopter has been added to the equipment list (Table 1-11) that would be utilized in transmission line construction.

(7) Comment: Section B. Figure 2-24, Page 2-68. This photograph is shown as a typical scene in the Spanish Fork Canyon corridor, but it was probably taken in Salina Canyon. This isn't significant, but we thought we would point out the discrepancy.

Response: The photo was taken in Salina Canyon. The title has been changed.

(8) Comment: Appendix II, pages 2-113, 2-127, 2-129, 2-131. That portion of the Spanish Fork Canyon that falls within the boundaries of the Uinta National Forest has been inventoried and classified under the Forest Service Visual Management System. This system identifies the canyon as highly sensitive, while the Bureau of Land Management system used indicates medium sensitivity. The Forest Service system shows the transmission line crossing areas that have been classified as Retention, Partial Retention, and Modification. The BLM system does not show the landscape classifications. The majority of the most sensitive landscape affected (areas of Retention classification) is between Diamond Fork and the Spanish Fork substation. This is the most critical part of the line from the visual resource standpoint. The Retention visual quality objective requires all management activities to be subordinate to the characteristic landscape and, in general, means man's activities are not evident to the casual Forest visitor.

Response: A majority of the land (56 percent) from the mouth of Spanish Fork Canyon to Diamond Fork is classified "retention" by the U.S. Forest Service. The entire line over the Uinta National Forest has a greater amount of land in "retention" from Diamond Fork to Gilluly (6.5 miles), not the lower portion.

The Canyon section from Diamond Fork to the mouth of Spanish Fork Canyon appears to be in violation of the "retention" classification, and the proposed transmission line would compound this problem. Information concerning the Gilluly to the mouth of Spanish Fork Canyon transmission corridor is covered in Chapters 2, through 6 under Scenic Resources.

(9) Comment: Figure 3-5, page 3-60, showing critical points of contrast. That area indicating skyline over low-growing vegetation should be expanded to include the area from the mouth of Spanish Fork Canyon to Billie's Mountain. Along the rest of the line on National Forest land, careful tower placement can avoid the skyline.

Response: The illustration has been changed to include the area from the mouth of Spanish Fork Canyon to Billie's Mountain.

(10) Comment: Chapter 8: Section J, Page 8-161. This section of the Statement states that long-term plans indicate a need for three additional 345 kV lines through Spanish Fork Canyon are likely by 1990. These are for:

1. Wheeling Power for IPP
2. Huntington Units 3 and 4
3. Emery Units 3 and 4

In discussing Utah Power and Light's future plans with company officials, they have indicated to us that they foresee only one additional line being necessary down Spanish Fork Canyon. We feel this situation should be clarified and information obtained from the company, in writing, as to what their future plans really are for transmitting power down this corridor.

We also question the need for a 345 kV line for each of the above-mentioned units. According to the information we have received, one 345 kV line will transmit 780 megawatts. If each plant is designed to produce 430 megawatts, there would be 3,400 megawatts produced in this area. Including the present proposal, there are five 345 kV lines existing or planned from the Emery-Huntington area--two down Salina Canyon; one over the Manti top; one to the Four Corners region; and one down Spanish Fork Canyon. These five 345 kV lines should be able to transmit this power and have some additional capacity. If this information is correct, why would three additional lines be necessary?

It is also stated that these three additional lines could be converted into a 500 kV line. Is this possible to do and still transmit the same amount of power carried in three 345 kV lines?

We feel that future plans, needs, and line carrying capacities need to be expanded and evaluated in much more detail to allow sufficient information for comment.

Response: See response to Letter No. 22.

nn. Reed C. Christensen, United States Department of Agriculture, U.S. Forest Service - Manti-La Sal National Forest (Letter No. 40)

Comment: The effects of subsidence on lands above the Wilberg Mine are relatively unknown. It is not necessary to speculate on impacts associated with subsidence until further data is available. We have enclosed information written for a recent coal lease readjustment for your consideration. We think that this is a good approach to the subsidence problem and associated impacts. We also recommend that an inventory-monitoring program be initiated in conjunction with the U.S. Geological Survey to determine subsidence impacts and possible mitigation measures. Guidelines concerning these studies are contained in the May 17, 1976, Coal Mining Operating Regulations, Federal Register, Volume 41, No. 96. We do not feel that feasible mitigation measures can be recommended until impacts are known.

Response: A subsidence monitoring program would be established under the authority of the Coal Mining Operating Regulations of the U.S. Geological Survey. (See Chapter 4, Monitoring Requirements.)

M. COMMENT LETTERS

The following section contains reproductions of comment letters from agencies and recognized experts, presented in chronological order.

COLLEGE OF NATURAL RESOURCES
UMC 52
Utah State University
Logan, Utah 84322

August 17, 1976

DEPARTMENT OF
RANGE SCIENCE
752-4100 EXT. 7621

1

Mr. Gary F. George
Acting District Manager
Richfield District Office
Bureau of Land Management
850 North Main
Richfield, UT 84701

Dear Mr. George:

I have reviewed the draft environmental impact statement on the proposed Emery power project and offer then the following suggestions for improvement of the final statement in those areas of which I feel I have some experience.

I found the vegetation sections and vegetation response to pollutants to be extremely cursory. Even though we don't know much about the impacts of pollutants on wildland vegetation, I feel that you should recognize that there are potential problems. Of particular concern was your complete lack of acknowledgement of the presence and importance of cryptogamic plants. Soil cryptogamic crusts, composed of mosses, lichens and algae, have been found to be of great importance on the Colorado Plateau in holding the soil together and contributing nitrogen to these ecosystems. I have enclosed for your consideration a recent review paper which summarizes what is known about these cryptogamic crusts and the known and potential effects of man and his activities upon them. Since these plants seem to be very sensitive indicators of environment disturbance I feel that more attention should be paid to them by land management agencies. Thank you for consideration of these ideas.

Sincerely yours,

Neil E. West

Neil E. West
Professor

NEW:ja

Encl.

Encl.

2

INTERMOUNTAIN CONSUMER POWER ASSOCIATION

A Non-profit Cooperative Organization of Consumer Owned
Electric Utilities

Phone (801) 561-1436 or 561-3411
8722 South 300 West
P. O. Box BB
SANDY, UTAH 84070

August 20, 1976

Bureau of Land Management
850 North Main Street
Richfield, Utah 84701

SUBJECT: Comments on Draft Environmental Statement for Emery Plant

The Intermountain Consumer Power Association (ICPA) is comprised of 38 members, serving the areas shown on the attached map. ICPA presently acts as an Agent to secure and administer wholesale power supply contracts for 29 of these members.

In December of 1975 ICPA completed a contract with the Utah Power & Light Company to purchase firm power and energy from generation planned to be completed in 1980, which is the Emery No. 2 unit. Until this unit is on line UP&L makes power and energy available to us to meet our members' needs on a non-firm basis.

ICPA is a participant in studies of other generation facilities including the proposed Intermountain Power Project. However, even if that Project is built, and it is presently uncertain that it can be, we will probably continue to purchase some of our members' power and energy requirements from UP&L. We therefore support UP&L's efforts to gain approval to operate these plants and substantiate their need for this development.

Our major concern with the draft Environmental Statement is that the impacts of <u>not</u> building, or delaying this Project are not fully considered. Since power from this Project would be used throughout Utah, and in some areas of surrounding states, the effect of not having it available on overall environmental (i.e. living) conditions should be considered, not just specific selected impacts on surrounding natural phenomenon.

We believe the following data should be considered:

1. Even with a maximum conservation effort, (which we fully support) the total energy requirement of the Nation will probably continue to grow at a rate exceeding 3% per year.

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2. Electric growth rates will be substantially higher than for other energy forms, probably about 6% per year.

3. Growth rates in Utah will be higher than the national average.

4. Substantial unemployment and economic stagnation could result if energy requirements are not met in a timely manner.

5. Further reliance on imported petroleum, as an alternate to coal is imprudent and unwise.

6. There is no other viable source of needed energy for this area if the Emery plant is not made operational.

We also question power from other sources being available for purchase on any sort of firm basis as suggested on page 8-185. Further there is no assurance that the construction schedule for the Naughton units can be accelerated.

ICPA urges prompt approval for this Project.

Sincerely,

Joseph C. Fackrell

Joseph C. Fackrell, P.E.
Executive Director

JCF:dj

3

Center for
Business &
Economic
Research
Brigham
Young
University
Provo, Utah
84601
(801) 374-1211
ext.3801

August 24, 1976

Mr. Gary F. George
Acting District Manager
Bureau of Land Management
Richfield District Office
850 North Main
Richfield, UT 84701

Dear Mr. George:

I would like to submit oral testimony regarding the Draft Environmental Statement--Emery Power Plant at the public hearing in the Provo City Center on September 9, 1976 at 7:30 p.m.

I will be representing the Center for Business and Economic Research, Brigham Young University.

Sincerely,

Martin J. Wistisen

Martin J. Wistisen
Director

MJW:dw

3

Center for
Business &
Economic
Research
Brigham
Young
University
Provo, Utah
84601
(801) 374-1211
ext.3801

August 18, 1976

Mr. Gary F. George
Acting District Manager
Bureau of Land Management
Richfield District Office
850 North Main
Richfield, UT 84701

Dear Mr. George:

In reference to your letter dated August 6, 1976, I am submitting these comments on the recently released Draft Environmental Statement--Emery Power Plant, hereafter, referred to as Statement. These comments relate to the socio-economic portion of the Statement.

It is recognized that the current "state-of-the-art" in projecting socio-economic impacts of major energy developments in rural areas is not very advanced. Furthermore, it is also recognized that rational men will differ in judging the quality and usefulness of any given environmental impact statement. However, when judged by even the weakest of standards, the socio-economic portion is inadequate and should be judged as unacceptable in achieving the objective of the Statement. The following examples are only some of many examples which could be cited as evidence of the poor quality of the socio-economic portion of the Statement.

On page 3-78 income projections are displayed which raise a number of questions. The income multipliers displayed appear to be of the Type I variety obtained from an I/O model. Just where they came from and the justification for using them are not provided. Since it appears that the purpose of Table 3-15 is to estimate total income and since total employment in Table 3-15 is the same as is shown in Table 3-11, there appears to be absolutely no justification for using income multipliers in Table 3-15. If we adjust for the effect of the improper use of the income multipliers in the computation of total income, then total income from the project in 1981 is only \$15.6 million rather than the \$21.8 million used in the study. Therefore, the Statement has overstated the income related to the project by 40 percent. Estimates of sales taxes should also be adjusted accordingly.

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No attempt has been made in the Statement to estimate the magnitude and timing of front-end public infrastructure costs. It seems essential that these projections be made at least for Carbon and Emery Counties as a whole and for specific impacted communities.

With regard to the section on taxes, it is not clear what kinds of taxes and which energy developments are included in the "$2 and $7 million in additional taxes by 1985 to Carbon and Emery counties" referred to on page 3-70 of the Statement. Furthermore, no analysis was done as to how taxes will be distributed between governmental units or whether the timing of tax receipts will be such that they can be used for necessary capital improvements in time to accommodate the expected population.

The sources listed in Figures 3-9 and 3-10 suggest that use was made of the SAFE-UPED Model 1975. Although footnote #C of Table 3-11 (which incidently is a completely incomprehensible description of what was done let alone why it was done) suggests that some other methodology (in addition to or in place of SAFE-UPED) was used to estimate the impacts on secondary (service) employment. The reader deserves the basic courtesy of being informed as to what forecasting methodology was used, its underlying assumptions, its primary strengths and weaknesses, and the justification for its use as opposed to alternative forecasting methods.

On page 3-81 it states that "About 75 percent of the plant operators and miners would probably live in Price and Helper." Although this may be true during the initial years of the project due to the inability of the much smaller Emery County communities to provide services for the impact population, as the Emery County population and service base grows it should be expected that a larger proportion of the people will begin moving into Emery County communities from Price and Helper to avoid the daily 70 to 80 mile commute. The Statement has failed to pinpoint how much of the initial and final impact is expected to be in Emery County relative to Carbon County. Emery County is in a much more precarious state with regard to providing community services for a large population influx than the Price-Helper area. Due to this fact the Statement should have more clearly delineated the specific impacts on each of the small Emery County communities.

As indicated in the Statement, there is and will occur tremendous socio-economic upheaval in Emery County as a result of this project. However, the Statement did not even attempt to delineate between the positive and negative impacts on the indigenous population. It is expected that many people in Emery County will not benefit either directly or indirectly from the project. In fact, these people, in some instances, may suffer serious socio-economic costs. Who are these people? How will they be hurt? And what ameliorating actions should and could be taken to

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mitigate some of the adverse impacts of the project on these people? These are questions the Statement ignores.

In my opinion, better treatment of the socio-economic impacts expected in Carbon-Emery Counties is contained in a study done by Evan Turner entitled The Impacts Associated With Energy Developments in Carbon and Emery Counties, Utah: Part I - Economic and Demographic Impacts. This study was co-sponsored by the Utah State Office-USDI, and the Bureau of Land Management through the Utah State Science Advisor. It is puzzling why not even one reference was made in the Statement to this study.

I hope these comments will prove useful.

Sincerely,

Martin J. Wistisen
Director

MJW:blm

4

United States Department of the Interior

BONNEVILLE POWER ADMINISTRATION
P.O. BOX 3621, PORTLAND, OREGON 97208

OFFICE OF THE ADMINISTRATOR

In reply refer to: AJ

August 25, 1976

Memorandum

To: District Manager, Bureau of Land Management, Richfield, Utah

From: E. Willard, Assistant to the Administrator - Interagency Relations

Subject: Review of Draft Environmental Impact Statement on the proposed Emery Power Project, Utah

Thank you for sending us a copy of subject statement. This project appears to provide a suitable means for producing energy economically from an abundant coal resource at a favorable location on the WSCC networks and with minimal (and acceptable) impacts on the environment. The draft statement is quite complete, both as a document and in the consideration given the detailed impacts.

We appreciate the opportunity to review this statement.

E. Willard

5

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
650 CAPITOL MALL
SACRAMENTO, CALIFORNIA 95814

REPLY TO ATTENTION OF
SPKED-W

26 August 1976

Mr. Donald L. Pendleton
District Manager
Bureau of Land Management
850 North Main Street
Richfield, Utah 84701

Dear Mr. Pendleton:

This is in response to your letter dated 6 August 1976 addressed to our Salt Lake City, Utah office requesting review and comments on the draft environmental impact statement for the proposed Emery Power Project located near Castle Dale, Utah.

We have reviewed the statement and the proposed project will not conflict with either flood control or other programs within our jurisdiction. However, it is recommended that flood control be carefully considered as the project proceeds, and that facilities be designed and constructed in a manner so as to avoid enroachment on flood plains and restrictions of natural waterways. Also, a Department of the Army permit from this office may be required under Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) for activities involving disposal of either dredged or fill materials in waterways.

Thank you for the opportunity of reviewing the statement.

Sincerely yours,

Rex C. Dunn
GEORGE C. WEDDELL
Chief, Engineering Division

6

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION
507 25TH STREET
OGDEN, UTAH 84401

8400

August 31, 1976

Mr. Gary F. George
Acting District Manager
Richfield District Office
Bureau of Land Management
850 North Main
Richfield, Utah 84701

Dear Mr. George:

The following comments relate to the request dated August 6, 1976 regarding the Draft Environmental Management Statement for the Emery Power Plant site. Our comments pertain mainly to the vegetation aspect and rehabilitation of disturbed sites.

On page 1-85 under "Reseeding," the statement is made that "species mixtures native to the site would be first choice, if available." Although it is desirable to include superior native species, various introduced species have proven equally successful on many range lands, and some have a distinct advantage over native species from the standpoint of seed availability and quickness of establishment. It is preferable to use both native and introduced species on these sites.

Comments are made in several places that it would be a long-term program to revegetate certain areas. Present knowledge indicates that time required for successful establishment can be greatly reduced by use of containerized plants, especially shrubs, on critical areas where immediate success by direct seeding might be questionable.

The statement on page 6-10, that "increased activity would add to the pressure on threatened and endangered species," is highly presumptive. At this point, it is unknown what threatened or endangered species would be involved--if any-- and/or what their requirements are for maintenance. The area should be checked for these species, but not ruled out if any are found.

Although disturbance often disrupts ecosystems, it can also create diversity of habitat for small animals, birds, and even large game animals, and, thus, improve the overall environment for these species. In other words, with astute planning, some adverse impacts of disturbance can be mitigated. It would be highly desirable to utilize

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some landscape architecture in rehabilitation programs which seek to provide soil stabilization, wildlife habitat, esthetics, etc. on disturbed areas.

The word "saltbrush" is used to refer to Atriplex species throughout the report, whereas the correct word is "saltbush." Also, the list of species on page 2-119 contains several spelling errors and common plant names that are not in standard use. A copy of this page is attached showing suggested corrections.

Another minor comment: the map on page 2-117 does not include the symbol "An" in the legend, although it is used in the diagram. We assume it could mean "annuals," but this isn't clear.

R. D. Lindmark

R. D. LINDMARK
Assistant Director

Enclosure

9

FEDERAL ENERGY ADMINISTRATION
REGION VIII
1075 South Yukon
P.O. Box 26247, Belmar Branch
Lakewood, Colorado 80226

SUBJECT: Region VIII EIS Review Comments DATE: September 3, 1976

FROM: Regional Administrator

TO: Dr. Robert J. Stern, Director
Office of Environmental Impact
Office of Conservation and Environment
Room 7113, Federal Building
12th and Pennsylvania, NW
Washington, DC 20461

The following Environmental Impact Statement has been reviewed by Region VIII personnel:

Title: Emery Power Plant, Emery County, Salt Lake City, Utah

Type: [X] Draft [ ] Final [ ] Assessment

Preparing Agency: Bureau of Land Management

Priority: [ ] 1 [X] 2 [ ] 3

EIS Control No. 76-235 [ ] None

Control Dates: Trans. Req'st 8-13-76 [X] OEI [ ] Other

Rec'd by RES 8-23-76 (Received from BLM on 8-9-76)

Due to OEI 9-13-76 FEA Resp. Due 9-20-76

[ ] The above subject document is acceptable without comment.

[X] The comments in Attachments A are herein submitted for your consideration, consolidation and transmittal to the appropriate agency(s).

[ ] This EIS has energy related implications of significance to the FEA. These implications are outlined in Attachment _____ and are herein included for NEPA consideration.

cc: Charles Denton, FEA, Salt Lake City, Utah
✓Mr. Gary F. George, Acting District Manager
Richfield District Office, Bureau of Land Management
850 North Main, Richfield, Utah 84701

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ATTACHMENT A

A comprehensive review of the EMERY Draft EIS indicates several energy-related issues which have not been adequately addressed. These issues are summarized as follows:

A. A check with the Utah Power and Light Company indicates that Emery No. 1 has been under construction for well over a year, is proceeding on schedule, and should be on line by April 1978. Unit No. 2 is well into the engineering stage and will target in on line date of 1981. The EIS is quite misleading, particularly in the alternatives section in that the EIS is written as if no construction had been initiated. The alternate plant sites, water and service lines could not be considered seriously as alternates since large capital expenditures and materials have been committed at the prime location. In this respect it would appear that this EIS is not following the prescribed NEPA process.

B. The statement covers most plant and mine related environmental aspects quite well, although there is a lack of cohesion and completeness with reference to the energy portion of the document. The information which addresses energy and energy utilization is scattered (pages 6-14, 7-9, 7-10, 8-169) and does not present a true picture of actual input VS output BTU values that would display the energy efficiency of the operation. It is suggested that the BLM consider a concise net energy analysis for the proposed action. A paper on this subject was forwarded to the BLM from the regional office on August 18, 1976.

C. The EIS does not adequately cover the extent of the reserves at the Wilberg Mine. The Wilberg Mine is mining from the Hiawatha Bed and the adjacent Deer Creek Mine is mining from the Blind Canyon Bed, both of which will eventually overlap; however, no mention was made on other coal beds and other possible resources in the mining area. This discrepancy could be cleared up by addressing the following:

1. A more comprehensive description is needed on the coal geology in this area including the underlying and overlying coal beds not being mined. Coal literature[1/] indicates that an Upper Bear Canyon Bed and an Upper Hiawatha Bed may exist in the mining area. If these beds are present, are they economical to mine? Data one way or the other should be made available. See enclosure "A."

1/ Reference to "Wasatch Plateau Coal Field," by H.H. Doelling, January 1971, Utah Geological and Mineralogical Survey.

2. A Geological Stratigraphic column showing coal beds and other possible energy bearing formations (i.e., oil, gas, uranium) should be included. See Enclosure "B."

3. It was noticed, according again to literature reviewed, that the Ferron, Emery, and Dakota Formations contain coal in certain areas in the Wasatch Plateau. Is this true of the Peabody area? If so, is the reserve economical to mine? See Enclosure "B."

4. Include a discussion addressing the exploration activities for other mineral resources. For example, information reviewed about Emery County indicates a good possibility for oil and gas and a fair possibility for uranium in the mining area. Subsidence mining would make future extraction of these resources extremely difficult, if not impossible; consequently, timely exploration should be accomplished prior to large-scale mining. See Enclosure "C."

D. Subsidence, in the magnitude of 1-10 feet, was discussed on pages 5-11 and 12. According to the presented information, subsidence in this area can be expected to occur quickly and severely. Since underground aquifers undoubtedly will be intercepted and changes will occur in surface drainage, a comprehensive effort should be undertaken to research the cumulative effect on drainage patterns and water quality caused by these mines and others that may alter present water conditions. Ranchers and others holding water rights have the right to the same quality and quantity of water during and after mining as they had previous to large-scale mining. Only adequate planning before, during, and after mining will ensure that the conditions will continue.

E. The most serious question with respect to this entire energy development is the availability of an adequate water source both for plant operations and the population growth increase. This question was discussed with personnel with the Utah Power and Light Company and seems to remain open as to the exact resolution. Since the success of the operation depends upon this resolution, it is suggested that the Final EIS include added data and alternatives.

F. The Draft EIS covers problems encountered in the socioeconomic area (i.e., inadequate housing, police protection, fire protection, water, schools, etc.), but there is a noticeable lack of solutions and discussion as to how the companies involved plan to help solve the problem. It is quite obvious the major impact in this area is due directly to development of power plants and coal mines by Utah Power and Light and the Peabody Coal Company, respectively; but the lack of front-end funds, company guidance, and overall help for the impacted communities is also quite apparent. Other areas of concern expressed by our regional office of Socioeconomic Impacts are as follows:

1. Changes in both mining and agricultural activities aligned with changes in demand for land have impacted housing in the county quite negatively. Additional statements relative to zoning and code enforcement added to chapters 7 and 8 would bring added awareness to the problem.

2. Property tax data (pages 2-83) could be enhanced with additional property tax data provided in 1976 WGREPO study, Taxation of Coal Mining Review.

3. In chapters 7 and 8 reference to several 1975 Utah State Legislature acts impacting the county (namely, Utah Resource Development Act, Building Schoolhouses Act, and Special Service District Act) would alert users of the EIS to appropriate legislative checkpoints.

4. Emery County shows significant increase in assessed evaluation and increased county revenues but the county financing for planning, including zoning, is minimal (see DRI report, July 1976, Analysis of Financing Problems in Coal and Oil Shale Boomtowns, Appendix D). No mention is made of proposed "labor camp" for construction workers (proposal by Utah Power and Light) or mobile home court (Peabody Coal).

5. Emery County officials are working to form a special service district. Some reference should be made to same, as it is relative to land use and management, particularly for the town of Huntington.

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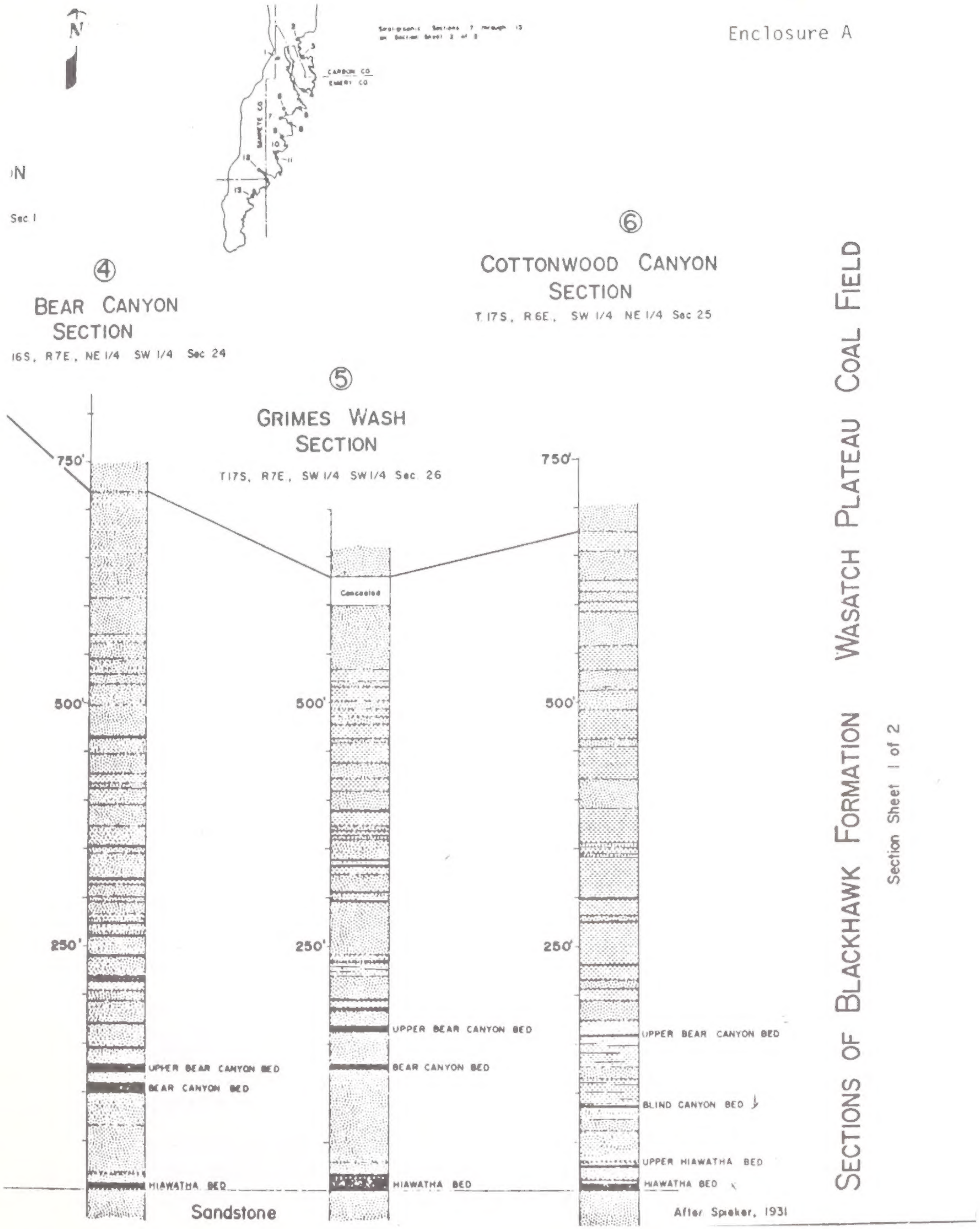
Enclosure A



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GENERALIZED SECTION OF ROCK FORMATIONS
WASATCH PLATEAU COAL FIELD, UTAH

Enclosure B

System	Series	Group	Stratigraphic unit	Thickness Feet	Description
TERTIARY	Eocene		Green River Formation	---	Chiefly greenish lacustrine shale and siltstone.
		Wasatch Group	Colton Formation	300-1500	Varicolored shale with sandstone and limestone lenses, thickest to the north.
	Paleocene	Wasatch Group	Flagstaff Limestone	200-1500	Dark yellow-gray to cream limestone, evenly bedded with minor amounts of sandstone, shale, and volcanic ash, ledge-former.
CRETACEOUS	?	Wasatch Group	North Horn Formation (Lower Wasatch)	500-2500	Variegated shales with subordinate sandstone, conglomerate and fresh-water limestone, thickens to north, slope-former.
	Maestrichthian	Mesaverde Group	Price River Formation	600-1000	Gray to white gritty sandstone inter-bedded with subordinate shale and conglomerat. . ledge and slope-former.
	Campanian	Mesaverde Group	Castlegate Sandstone	150- 500	White to gray, coarse-grained often conglomeratic sandstone, cliff-former, weathers to shades of brown.
		Mesaverde Group	Blackhawk Formation *MAJOR COAL SEAMS*	700-1000	Yellow to gray, fine- to medium-grained sandstone, interbedded with sub-ordinate gray and carbonaceous shale, several thick coal seams.
		Mesaverde Group	Star Point Sandstone	90-1000	Yellow-gray massive cliff-forming sandstone, often in several tongues separated by Masuk Shale, thickens westward.
	Santonian	Mancos Shale	Masuk Shale	300-1300	Yellow to blue-gray sandy shale, slope-former, thick in northern and central plateau area thins southward.
		Mancos Shale	Emery Sandstone *COAL (?)*	50- 800	Yellow-gray friable sandstone tongue or tongues, cliff-former, may contain coal (?) in southern part of pla-teau if mapping is correct, thickens to west and south. Coal may be present in subsurface to west.
	Coniacian	Mancos Shale	Blue Gate Member	1500-2400	Pale-blue-gray, nodular and irregularly bedded marine mudstone and siltstone with several arenaceous beds, weathers into low rolling hills and badlands, thickens northerly.
	Turonian	Mancos Shale	Ferron Sandstone Member *MAJOR COAL SEAMS*	50- 950	Alternating yellow-gray sandstone, sandy shale and gray shale with important coal beds of Emery coal field, resistant cliff-former, thickens to the south.
	Cenomanian	Mancos Shale	Tununk Shale Member	400- 650	Blue-gray to black sandy marine slope forming mudstone.
	Albian		Dakota Sandstone *MINOR COAL*	0- 60	Variable assemblages of yellow-gray sandstone, conglomerate shale and coal. Beds lenticular and dis-continuous.

Enclosure C

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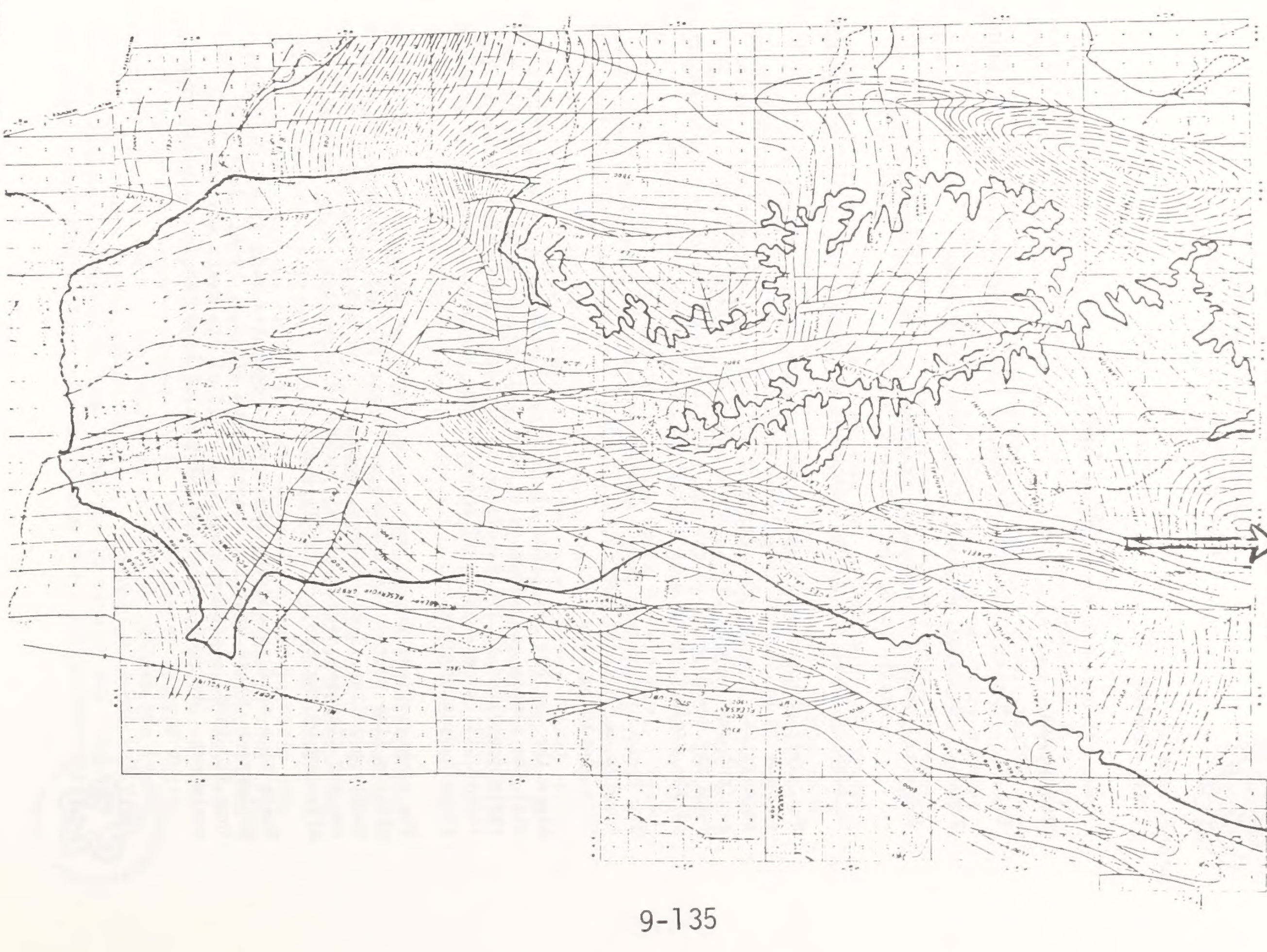

Deer Creek & Wilberg mine

MAP SHOWING GEOLOGIC STRUCTURE - WASATCH PLATEAU GAS FIELDS

CONTOURS ON TOP FERRON SS

10

United States Department of the Interior
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
655 Parfet Street
P.O. Box 25287
Denver, Colorado 80225

IN REPLY REFER TO:
L7621 (RMR)CS

SEP 1 3 1976

Memorandum

To: District Manager, Bureau of Land Management, Richfield, Utah

From: Regional Director, Rocky Mountain Region

Subject: Draft Environmental Statement for Emery Power Project, Castle Dale, Emery County, Utah (DES 76-29)

We have reviewed the subject document and submit the following comments:

The draft environmental statement suggests that a serious effort will be made to be in full compliance with the legislative and executive authorities for the protection of all cultural resource sites in the project development area. Major areas of concern, having to do with both the development of project guidelines and the actual implementation of the project, have been addressed. Others are noted below.

The Table of Contents for Chapter 3 erroneously shows discussion of impacts on Cultural and Paleontological Resources to begin on Page 3-48. This should be Page 3-51.

Since the National Register of Historic Places is a changing document with the continuous addition of new listings, we suggest that this be again consulted in the future so as to make certain that no new sites listed will be adversely affected by the implementation of the proposed project developments.

The archeological survey work to be completed should include all transmission line routes; coal conveyor lines; all haul, access, and service roads; pipeline right-of-ways, equipment storage sites; borrow areas; the ash disposal areas; and all other terrain that it is known will be affected by the project developments.

There is a need to address the several comments made by Mr. Milton L. Weilenmann, State Historic Preservation Officer, by his letter of June 22, 1976, reproduced on Page 2-125 of the draft environmental statement. By such action, the Bureau of Land Management would then

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

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be in a position to determine if the preferred project development area, based on all known cultural resource data, would have less adverse impact upon cultural resource sites than the alternative sites considered.

The identification of any such resources of significance would then necessarily require compliance with Executive Order 11593, Section 106 of the National Historic Preservation Act of 1966 and the Advisory Council on Historic Preservation "Procedures for the Protection of Historic and Cultural Properties" (36 CFR, Part 800). There is, as well, Agency responsibility to establish in those situations of adverse effect upon cultural resource sites that all appropriate measures for their protection or for the recovery of the scientific knowledge they provide have been taken.

The summary states that "Stack emissions could also cause a reduction in visibility and could produce an evident yellow discoloration of the air."

The text, on page 3-18 indicates: "Under limited dispersion conditions, if the 0.37 ppm NO_2 concentration level was reached, a yellowish discoloration would also be observed." Table 3-4 shows in all three model projections that 3-hour maximum ground level concentration will reach 0.37 ppm. If ground level concentrations are that high 3 kilometers downwind of the stack, then higher concentrations would certainly occur at elevations above ground level and over an undefined distance from the stack. This argues for the substitution of the word "would" for "could" in terms of the production of evident yellow discoloration.

It is also disappointing to note that there have been no projections, or modeling, of the visibility impacts of the Emery plant specifically. The only effort in this direction is an unconvincing attempt to draw parallels between the existing Huntington plant and the Emery project. Studies of the Huntington plant are also incomplete. The phrase on page 3-27 referring to the Huntington plant study

> " * * * before possible impacts of power plant emissions on visibility can be fully determined, it will be necessary to sample air under highly stable conditions and during the period of highest relative humidity."

indicates that even if the comparison between Huntington and Emery were convincing, the opportunity to complete the Huntington study evaporated with the breakdown of the plant.

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As development and other disturbances of soil surface proliferates in the west, the effects of air-borne dust on visibility becomes increasingly a matter of concern. Dust has traditionally been accepted as a normal and natural constraint to visibility in this country, particularly during periods of high wind. It is, however, indicative of the growing problem to note the comment on page 3-26 in the draft EIS that the most striking difference in visibility between pre-Huntington and post-Huntington periods was an increase in reduction in visual range due to soil dust of about 50 percent after the Huntington plant was installed. Soil disturbances which loosen soil particles are the major source of wind-borne dust. The cumulative effect of small disturbances are as important as major ones, and they are considerably more difficult to mitigate. The draft EIS recognizes, but does not attempt to quantify, the impact on visibility of dust, resulting directly and indirectly from construction and operation of the power project.

The National Ambient Air Quality Standards address accumulated concentrations of controlled pollutants regardless of the number, type, or distribution of sources impacting a particular air space. Table 3-4 displays information as if the standards were controlling on the basis of incremental increases rather than cumulative pollutant loads in the air space. This is not, apparently, significant in most controlled concentration levels except that it would indicate that cumulatively a larger percentage of the permissible pollution loading would occur as a result of the plant, thus limiting options for future growth in the area. There are two areas where it may be significant. The first is the anticipated maximum ground level concentration of SO_2 over a 3-hour period. Incremental increases expected from the Emery plant, from table 3-4 are a significant part (77 percent to 55 percent) of the total permissible under the ambient air quality standards. There is, in this case, no data provided for the background concentration. Background concentrations amounting to only 24 percent to 46 percent of the permissible standard would, if the incident coincided with the emission of maximum concentrations of SO_2 from the plant over a 3-hour period, result in violations of the secondary ambient air quality standards.

The second is as it relates to particulates. The annual maximum ground level concentration from stack emissions in concert with natural background concentrations would amount to 52 percent of the concentrations allowed under secondary ambient air quality standards. This ignores the unquantified volume of particulates in the form of dust resulting from an aggregation of project-related sources. The maximum concentration of particulates over a 24-hour period is also not really known because there is the neglected aggregation of sources mentioned above and is no quantification of natural background concentrations which should be

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added to stack emissions to determine the percentage of the standard filled to date.

The effect of these factors is that it has not been demonstrated that the project would meet secondary ambient air quality standards for maximum 3-hour ground level SO_2 concentrations, and maximum annual and 24-hour ground level particulate concentrations. This is not consistent with the statement, "These stack emission levels would equal, or better, the applicable air quality standards" contained in the summary.

The discussion of the environmental impacts of the Garfield alternatives does not include any mention of the effects on aquatic or riparian ecosystems that would result from the construction of an impoundment on the Escalante River. This would be the most immediate, aside from possible silting during construction, and potentially the most devastating of the impacts associated with the Garfield alternatives.

Glen T. Bean
for Deputy Regional Director
Lynn H. Thompson

11

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
REGIONAL OFFICE
EXECUTIVE TOWER - 1405 CURTIS STREET
DENVER, COLORADO 80202

REGION VIII

September 14, 1976

IN REPLY REFER TO:
8DE

Mr. Donald L. Pendelton
District Manager
Richfield District Office
850 North Main Street
Richfield, Utah 84701

Dear Mr. Pendelton:

This is in response to the Bureau of Land Management Draft Environmental Impact Statement (EIS) on the Emery Power Generating Plant located near Castle Dale in Emery County, Utah.

We wish to comment first on the statement (see chapter 4, page 17) to the effect that the presentation of mitigating measures for impact on human resources is beyond the scope of the draft EIS because "Mitigation of impacts to human resources does not presently come under the jurisdiction of any Federal Government agencies, nor have the state, local agencies, or company made commitments." This position appears to us to be incompatible with the Council on Environmental Quality Guidelines of 1973. Part 1500.2 of the Guidelines states the following: "In particular, agencies should use the environmental impact statement process to explore alternative actions that will avoid or minimize adverse impacts and evaluate both the long and short term implications of proposed actions to man, his physical and social surroundings and to nature. Agencies should consider the results of their environmental assessments... and use all practicable means, consistent with other essential considerations of national policy to restore environmental quality as well as to avoid or minimize undesirable consequences for the environment." Part 1500.8(a)(3)(ii) of the Guidelines which stresses the importance of indirect impacts, states that indirect impacts on existing patterns of social and economic activities may be more substantial than direct impacts and points out that "the effects of the proposed action on population growth may be among the more significant secondary effects."

Among the principal concerns of the Department of Housing and Urban Development (HUD) are the effects of a proposed action, which will cause population growth, on the supply and cost of housing for people of low and moderate incomes and

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people on fixed incomes, including the elderly. We are extremely concerned about the socio-economic impacts (including the availability and cost of housing for lower income people) of the population growth that will occur in Carbon and Emery Counties as a result of the power plant construction and associated coal mining activity. We are informed, in chapter 2, pages 80-84, that prior to the start of the Emery Project, the population of Carbon County grew by 13.1% to 17,700 people and the population of Emery County increased by 21% to about 6,800 people as a result of renewed mining activity and power plant construction in the area. The adverse effect of this population growth on the availability and cost of housing is described on page 84 of chapter 2. In chapter 5, page 22, a housing shortage is projected for the next five years in Helper, Price, Huntington, Castle Dale and Ferron, with a need for 1500 new homes for the new employees at the Emery Project and a continued rise in the price of homes.

We urge that the Final EIS on the Emery Project address the socio-economic impacts, including the housing problems referred to above, with proposals for mitigation of the adverse socio-economic impacts.

In regard to mitigation of socio-economic impacts, we should like to call your attention to Section 9.(a) of the Federal Coal Leasing Amendments Act of 1975 (Public Law 94-377, August 4, 1976). We recommend that you contact the appropriate officials of the State of Utah in order to determine the State's plans concerning the use of funds referred to in Section 9 of the Act for mitigation of the socio-economic impacts of the Emery Project. We further recommend that the State's plans in this regard be presented as part of the Final EIS on the Emery Project.

It appears to us that the Draft EIS on the Emery Project is deficient because it does not contain a section which presents plans for the amelioration of the socio-economic impacts of the project.

Sincerely,

Robert J. Matuschek

Robert J. Matuschek
Assistant Regional Administrator
Community Planning and Development

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DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

ROCKY MOUNTAIN REGION
10455 EAST 25TH AVENUE
AURORA, COLORADO 80010

SEP _ _ 1976

United States Department of the Interior
Bureau of Land Management
Richfield District
Environmental Project Staff
P.O. Box 767
Richfield, Utah 84701

Dear Sir:

We have reviewed your draft Environmental Impact Statement on the Emery project.

The project involves FAA jurisdiction by law or expertise, chiefly from the standpoint of adverse impact on public airports and navigation aids which involve FAA planning, development or maintenance, airspace intrusion, air traffic and electromagnetic interference (direct and passive). To the best of our knowledge, the activities of the project will not significantly interact on these factors.

However, the routing of the transmission line near the Provo Airport should be carefully considered so as to not be a hazard to aviation.

Thank you for the opportunity to review your DEIS on the Emery project.

Sincerely,

Fred H. Jaeger Jr.

FRED H. JAEGER, Jr.
Chief, Planning Staff

14

UTAH POWER & LIGHT COMPANY

1407 WEST NORTH TEMPLE STREET
P. O. BOX 899
SALT LAKE CITY, UTAH 84110
801-350-3422

F. N. DAVIS
VICE PRESIDENT
ENGINEERING AND CONSTRUCTION

September 18, 1976

Mr. Carl Thurgood, Team Leader Emery - EIS
Bureau of Land Management
Environmental Project Staff
146 North Main Street
Richfield, Utah 84701

Subject: Comments on Emery Draft EIS

Dear Mr. Thurgood:

Enclosed are Utah Power & Light Company's comments and some additional descriptive material relative to the Emery Draft Impact Statement.

Very truly yours,

FND/s Encl.

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September 18, 1976
s

UTAH POWER & LIGHT COMPANY
COMMENTS ON THE EMERY DRAFT ENVIRONMENTAL IMPACT STATEMENT

Page 1-9, Table 1-1, Coal:

The table states that there will be 84 million tons of coal burned during the projected 35 year plant lifetime. This implies that the plant will operate at an 80% load factor over its entire 35 year lifetime. Over the total lifetime, average conditions pertain. The load factor will probably be between 60% and 65% and the total coal usage will be between 60 and 70 million tons for two 400 mw units.

Page 1-13 B(5):

The water pipeline from the Millsite Reservoir to the plant will not cross any national resource lands, therefore no right-of-way will be required from BLM.

Page 1-26, D.1., Second Paragraph, Second Line:

3028 mw should be 2968 mw.

Page 1.29, Total Needs:

3028 mw should be 2968 mw.

Page 1-33, 4.a., First Sentence:

Change 260 feet high to 232 feet high, change 270 feet wide to 272 feet wide and change 520 feet long to 528 feet long.

Page 1-38 4b, Cooling Towers Third Paragraph:

In regard to cooling towers, covered on Page 1-38, it now appears likely that, initially, wet cooling towers will be installed on the two units at Emery. We believe that this is adequately covered in the Alternatives Section, Pages 8-136, 8-137 and 8-138. The dry cooling section still, however, may be added to the two Emery units at some time in the future.

Attached is a water balance covering two units with two wet cooling towers, enclosed as Attachment No. 1.

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Page 1-43, c. Emission Control Equipment:

The following information is furnished to give the most current information available regarding installation of SO_2 removal equipment on the two units at Emery.

Current construction permits issued by the Utah Department of Environmental Health contemplate the installation of SO_2 removal equipment on these units. The Utah Department has now ammended the regulations under which these permits were issued and authorized the Company to apply for authority to operate the units without such equipment under requirements limiting the average sulfur content of coal to be burned to an average of 0.6% or less.

The controversy with the Environmental Protection Agency over the application of significant deterioration regulations should this authority be applied for and granted remains unresolved and is the subject of litigation filed by the Company in the United States Circuit Court of appeals for the District of Columbia Circuit.

The Company's proposal remains unchanged and is to operate the units without such equipment if and when needed approvals can be obtained. Therefore, the statement showing the air quality impacts of this operation is both legally and factually adequate; however, since certain adverse environmental impacts from the installation of such equipment, even though pollutant emissions to the ambient air would be reduced, these impacts should be included in the discussion of this alternative.

These impacts include increased consumption of water, disposal of the waste product from the removal equipment and the consumption of substantial amounts of electric energy in the operation of such equipment.

Page 1-43 Table 1-4:

Show SO_2 emissions are for no SO_2 control.

Page 1-53, Figure 1-20:

See comments for Page 1-35, Figure 1-11.

Page 1-66, Coal Conveyor:

The decision to install a conveyor will depend upon economic considerations and upon the experience with truck coal haulage for the first unit. The decision will also depend upon the outlook for developing the North Horn coal reserves.

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Page 1-75:

Item 1 General Description - delete last two sentences - the raw water line will not cross any national resource land.

Page 1-77:

Item 1 first sentence top of page - change tank to pond. Should read: "A pressure control pond will be located near Clawson."

Page 1-86:

The operation of the ash system could be more accurately described as follows: "Bottom ash would be carried in a water slurry from the boilers to dewatering bins. The fly ash collected by the electrostatic precipitator will be collected dry in the fly ash silo. The dewatered bottom ash and moistened fly ash will be hauled by truck 1.3 miles to the disposal area over the ash haul road."

Page 2-59 Item (1) Cultural (Prehistoric and Historic):

Field surveys have been made of the Emery-Salina Canyon-Sigurd, Camp Williams-Sigurd, Emery-Spanish Fork-Camp Williams transmission lines. These surveys include extensive surface survey of the line right-of-way and surface salvage of any sites discovered along with complete description and mapping of each site discovered.

Page 1-78, 8. Transmission Lines, a. Routing:

Between the Emery 345 kv switchyard and the Huntington 345 kv switchyard the Emery-Spanish Fork-Camp Williams 345 kv transmission line will utilize the existing Huntington-Sigurd 345 kv transmission line. This line will be looped into the Emery switchyard. Actual new transmission line construction of the Emery-Spanish Fork-Camp Williams transmission line will commence at the Huntington Switchyard.

Page 1-80, Figure 1-26:

The transmission map does not show the loop into Huntington 345 kv switchyard or the proposed route near Provo.

Page 1-81, b. Size and Design:

See Attachment No. 2 for additional data.

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Page 1-85,9. Waste Production and Disposal:

Waste products from alternative SO_2 scrubbers are not included here. Pertinent data on predicted waste products of scrubbers are included as Attachment 3.

Page 1-117, Table I-6-1:

There have been some minor changes in building sizes. The only one of significance in the table is #49 Paint Shop; the size is 26 feet long, 38 feet wide and 13 feet high. A table of current building sizes is enclosed. Attachment No. 4A & 4B.

Pages 1-127, 128:

Attached is photograph of the ultimate double circuit single pole steel structures to be used on the Spanish Fork-Camp Williams Section. Initially one circuit will be installed. Attachment No. 5.

Page 2-83 Item (3) Regional Tax Base:

Should use 1975 tax revenue for Carbon and Emery Counties and 1975 UP&LCo taxes. UP&LCo taxes paid Emery and Carbon Counties are as follows:

	1973	1974	1975
Emery	$ 603,407	$1,208,942	$1,875,949
Carbon	$ 561,349	$ 606,917	$ 725,040

Page 3-9, Table in Middle of Page:

Alternative figures for emissions with 80% SO_2 removal are attached. Attachment No. 6.

Page 3-15 Table 3-4:

NAWC's latest report on ambient SO_2 concentrations as calculated for Emery Plant Site Report No. 782-A Title: "Re-evaluation of the Potential Air Quality Impact of the Emery Plant" modifies NAWC's predictions shown on Table 3-4.

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Page 3-40 Water Resources:

Recommend that the report by Vaughn Hansen Associates entitled "Salinity Changes in the Colorado River from Development of Coal Fired Power Plants in Emery County, Utah" be included in the list of references and some comments made in this report be included in this section.

Page 3-43, Part 2:

The statements on increase of Total Dissolved Solids in Rock Canyon Creek due to the discharge of the Emery 001 and 002 drains, do not agree with data that has been obtained on a weekly basis before and after the drains were installed. A tabulation of the test results from 9/27/74 through 5/5/76 are attached. These data show that on the average the TDS concentration in Rock Canyon Creek is lower below the drains than above. There is no detectable correlation between the TDS load of the drain water and that of Rock Canyon creek, other effects completely mask this effect. There is some slight correlation with Johnson Bench Wash TDS and the downstream change in Rock Canyon, but that, too, is insignificant. Attachment No. 7.

Page 359, 61 & 62 Figures 3-3, 3-4, 3-6, 3-7 and 3-8:

The transmission line clearing drawings shown in Figures are not indicative of present accepted practice by UP&LCo. The clearing of the right-of-way is handled in the permit specifications and right-of-way is cleared by feathering, permitting low growth within rights-of-way, and avoiding skylines wherever possible. Structures appear to be relatively too close together on illustrations.

Page 3-94, Last Paragraph:

This again refers to an increase in salinity of Rock Canyon Creek. See data submitted above under Attachment No. 7.

Page 5-5, (c) Particulates:

The estimates of particulates released given here are taken from table 3-1 on Page 3-10 and represent full load conditions not average conditions. Also in line 8 the word "scrubber" is used, which should be electrostatic precipitator.

Page 5-11, 2. Specific:

Reference again to Rock Canyon Creek, see comments for Page 3-43 above and Attachment No. 7.

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Page 6-5 Fifth Line from Top of Page:

Now reads: "below levels that would acutely effect vegetation growth." We question use of the term "acutely". All tests that have been conducted and vegetation plot studies show no adverse effect on the vegetation at predicted concentrations.

Page 6-9 Item F Vegetation Third Paragraph:

See above comment.

Page 6-11:

Refer to report by Vaughn Hansen Associates entitled "Salinity Changes in the Colorado River from Development of Coal Fired Power Plants in Emery County, Utah".

Page 7-6 F Water Quality:

Need to consider the dissolved solids that have been eliminated by the reduction of irrigation return flow from the agricultural land retired by the Company. This reduction in dissolved solids will make a major contribution to the improvement of the salinity in the Colorado River. See Vaughn Hansen Report cited above.

Page 8-48: Last Paragraph:

First sentence now reads: "The Garfield East Site would receive coal from a drift driven about midway up the Straight Cliffs above the complex." It should read: "The Garfield East Site would receive coal from a drift driven in the base of the Straight Cliffs west of the plant site.

Page 8-63 (5) Water Resources:

It should be pointed out that the town of Escalante would be required by Utah State standards to meet primary or secondary sewage treatment regulations, thereby eliminating any untreated waste water discharges into the Escalante River.

Page 8-102:

First sentence reads: "Each unit will emit approximately 5.3 tons per day of ..." It should read "Both units together will emit approximately 5.3 tons per day using worst grade coal."

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Page 8-135 Last Paragraph, Second Sentence:

Now reads "There is a low pressure drop across the system..." It should read: "There is a high pressure drop across the system...".

Pages 8-160 and 8-161:

Three corridors (Salina Canyon, Manti Top, and Spanish Fork Canyon) have been identified as viable for transmission routes for the Emery-Huntington vicinity to the Wasatch Front load area. Installation of two 345 kv transmission lines in each corridor would provide a total firm (loss of one circuit) transmission capacity of 3200 mw uncompensated or 4700 mw with series capacitors (assuming resonance problems between generators and series capacitors can be resolved). With the present and firmly planned generating units in this area, (Huntington 1 and 2 and Emery 1 and 2) generating a total of approximately 1600 mw and allowing 400 mw for importation on the Four Corners Line, three corridors when fully developed would permit an additional 1200-2700 mw of generating capability in that area (including possible wheeling of approximately 400 mw for IPP generation). Construction of 500 kv lines to reduce the total number of 345 kv lines would considerably reduce the reliability and firm transmission capacity.

Reference is made on Page 8-161 that Units 3 and 4 at both Huntington and Emery and associated transmission are likely needed by 1990. Additional units may or may not be required by 1990 in the Carbon-Emery area and Huntington or Emery may or may not be the appropriate locations.

Discussion of the first modification to the Spanish Fok Canyon indicates that if a 345-138 kv connection were made to the Carbon 138 kv system the 138 kv lines in Spanish Fork Canyon could be eliminated. Only a portion of the 138 kv lines could be removed. The section from Diamond Fork to Spanish Fork would probably need to be retained for interconnection with the proposed Central Utah hydro generation units. The section from Carbon to Soldier Summit would probably be retained to supply existing and future loads along the segment which would exceed the capability of the 46 kv system. This modification would also increase the cost 8-10 million dollars.

The same comments about 138 kv line removal in Spanish Fork Canyon would apply to the second modification as discussed on Pages 8-163 and 8-164. The additional cost for this modification would be approximately 6 million dollars.

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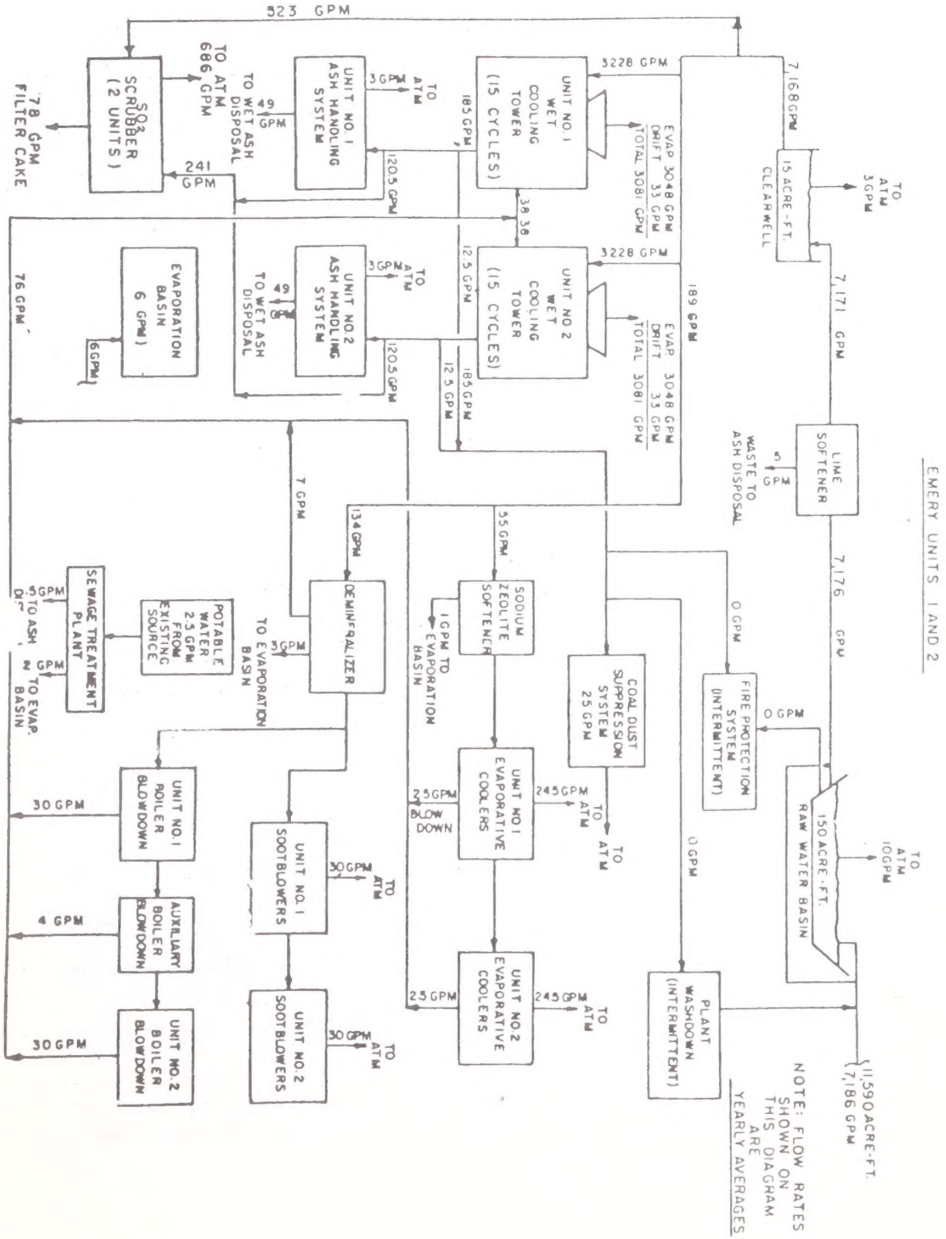
ATTACHMENT NO. 1



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ATTACHMENT NO. 2

COMMENTS ON HUNTINGTON-SPANISH FORK-CAMP WILLIAMS

345 KV TRANSMISSION - EIS

A 345 Kv transmission line is required from the proposed 430 MW Emery #1 generating unit to the Utah County and Salt Lake County areas. Growing loads in the Utah County area requires this transmission support no later than early 1978 to maintain an adequate voltage level. A 345 Kv step-down substation in the vicinity of the mouth of Spanish Fork Canyon which will electrically interconnect with existing lower voltage subtransmission circuits which distributes power throughout Utah County will provide this needed transmission voltage support. Approximately 175 MW of power will be supplied initially at this substation to Utah County with the balance of the power being transmitted to the existing Camp Williams 345 Kv step-down substation for distribution throughout Salt Lake County. In approximately ten years as the Utah County load continues to grow, an additional 345 Kv step-down substation will be required in the Orem-Geneva area. This new substation could best be served from the Spanish Fork-Camp Williams 345 Kv line routed in the appropriate location.

Early in the Summer of 1974, a routing for the Camp Williams-Spanish Fork-Huntington 345 Kv line was tentatively selected. Routing the line where it could connect to the initial Spanish Fork and future Orem-Geneva 345 Kv step-down substations was also one of the primary considerations. Shortly after the selection of this routing, meetings

were held with the Utah County Commission and the Provo City Commission to apprise them of the plans. Subsequently, meetings with neighborhood groups and individual property owners in the west Center Street (Provo City) and Geneva areas were held in which land values and minor relocations to accommodate specific needs were discussed.

It is the policy of Utah Power & Light Company to try to obtain right-of-way for 345 Kv lines in fee (i.e. ownership of land by Utah Power & Light) to assure no construction within the right-of-way that would preclude proper maintenance accessability and to avoid problems of radio and TV interference within the right-of-way. The width of the right-of-way is a function of these considerations and is never less than requirements of the National Electric Safety Code which is the recognized guide for proper electrical and physical clearances. The right-of-way width as determined by this code is a function of line voltage, tower height, span length (distance between towers), terrain, weather environment and other like considerations. It was determined that approximately a 120 foot width would be required through the area from Camp Williams to Spanish Fork and that it should be purchased in fee.

On July 8, 1975, Utah Power & Light Company representatives met with the Utah County Planning Commission to describe the proposed 345 Kv line routing through Utah County and answer questions concerning its necessity. Considerable concern was expressed at that time about the line route and a subsequent meeting was scheduled on September 17, 1975 with the Utah County Commission and Planning Commission. The meeting discussed two main topics - the necessity of the line on the east side of Utah Lake and the proximity of the line to the Provo City airport.

The necessity of the line on the east side of Utah Lake to supply the needs of Utah County presently (Spanish Fork Substation) and the future (Geneva-Orem area Substation) was pointed out. The alternative of proliferation of lower voltage lines (138 Kv) throughout Utah County was discussed.

The concern of the proximity of the proposed line to the Provo City airport was still evident and accordingly, an.application for clearance on construction plans was submitted to the FAA in September, 1975. A preliminary notification that the proposed "transmission line would exceed Federal Aviation Regulation Part 77.23(a)(3)" was issued by the FAA on November 28, 1975. The final ruling on this by FAA was confirmed on March 23, 1976 after their study had been completed and after comments from appropriate airport users had been received wherein FAA stated: "Accordingly, it is found that the proposed transmission line would have a substantial adverse effect upon the safe and efficient use of navigable airspace and would be a hazard to air navigation."

In the meanwhile, beginning in October, 1975, and continuing to August 12, 1976, some fourteen or more public and private meetings were held with Provo City officials and private citizens relative to location of a suitable route for the transmission line through Utah County. The Utah County and Provo City officials were convinced of the necessity for the line to supply the immediate and future power needs of the area. The alternative of routing on the west side of Utah Lake was seen as not feasible since it required construction in another part of Utah County (from Spanish Fork Substation westward across the south end of

Utah Lake) and would not provide for future needs in the Provo-Orem-Geneva-Lehi areas without a proliferation of lower voltage (138 Kv) lines. Prior to the final determination by FAA on March 23, 1976, two feasible alternative routes through Provo, in addition to the original route by the airport were considered and discussed in the above mentioned meetings. These were the "middle route" (approximately half way between the "airport route" and I-15 freeway) and the "freeway route" (located generally along the west side and adjacent to the I-15 freeway. Very strong opposition was expressed to the "airport route" and the "middle route" by experienced and knowledgeable pilots and users of the airport in addition to Provo Community planners. A joint resolution signed by Utah County and Provo City officials (attached) was submitted to Utah Power & Light Company in support of the "freeway route". A similar resolution from the "Order of Daedalians" (a national organization of pilots) was also received in support of the "freeway route". The two basic points of opposition to the "airport" and "middle" routes were succinctly summarized in the joint resolution:

1. "Whereas said high voltage power transmission line would be located in corridor subject to significant residential, industrial and other related urban growth during the next several decades."
2. "Whereas the location of said power line could also have a major impact upon the development and utilization of the Provo City Municipal

Airport by significantly raising the altitudes required for landings and effecting the safety of aircraft in landing or take-off postures under less than optimum conditions."

Subsequent to the ruling of FAA only the two alternative routes and minor variations thereto have been given serious consideration.

Opposition to the "freeway route" comes exclusively from people living near the proposed route and is based upon the following suppositions:

a. belief that the 345 Kv line poses a health hazard to neighbors.
b. belief that the adjacent property would be devalued.
c. belief that radio and TV reception to neighbors would be seriously affected.
d. belief that property owners in proposed right-of-way would not be fairly conpensated.

Many misconceptions concerning the effects of the proposed 345 Kv line on human health results from a highly controversial study performed by Russian scientists. This study, even if correct - and there is considerable doubt concerning that, deal with voltages and field intensities higher than being considered in this case. All Utah Power & Light Company 345 Kv transmission lines are subjected to intensive study prior to construction to insure that they are completely safe. The lines from Spanish Fork to Camp Williams is no exception - there will be no adverse biological effect from this line.

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There is considerable evidence to the effect that adjacent property is not devalued by the presence of a power line. A publication entitled "Resource and Land Investigations (RALI) Program" dated July, 1975, prepared under contract by the MITRE Corporation for the Bureau of Land Management states: "However, there is little clear evidence to indicate that a utility corridor actually decreases land values". It further states: "Although some home owners may move out of an established area after a line goes through the area, there is an absence of documentation to substantiate the idea that prospective purchasers either of the existing homes or in a new development are discouraged by the presence of a utility line".

There have been other national and regional studies of the impact of electric power transmission lines on real estate values, but little of this information has been compiled into one volume. Probably, the most comprehensive study was made by Louis E. Clark Jr., M.A.I., and F. H. Treadway Jr., M.A.I., and published by the American Institute of Real Estate Appraisers of the National Association of Real Estate Boards, 155 East Superior, Chicago, Illinois 60611. The publication is addressed to those persons having knowledge of the appraisal procedure and methods for determining the best estimate of value. However, the cited examples and case studies are comprehensive enough to indicate that in most cases the presence of a transmission line easement has little effect on the value of adjacent and neighboring lands.

Allegations that banks and other mortgage lending institutions

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have recently denied loans or indicated withholding the lending of money for home purchase in the "freeway route" area have been investigated by Utah Power & Light Company. The investigation revealed that none of the major banks nor lending institutions contacted have a policy which would deny loans because of a power line in the neighborhood.

Television reception outside the right-of-way will, in general, be unaffected by these power lines. There may be some instances where the metal structures and lines may cause some ghosting (multiple images) as observed on the TV screen. In almost every case, the relocation of the TV antenna can correct this problem. Utah Power & Light has, in extreme cases, provided a pole and installed the antenna where more than a hundred feet of relocation was required. The majority of customers that were affected by ghosting were those using rabbit ear or indoor antennas. The installation of outdoor medium priced antennas cured this effect.

Broadcast, or AM reception, should not be affected by anyone living near the line, and certainly not affected by those quite removed from the line. The most severe example would be listening to an out-of-town station, such as KVNU in Logan and driving a vehicle directly underneath the line. Under these conditions, an increase of background noise would be noticed. Studies have shown, that for the most part, the line will not interfere with the broadcast stations normally serving Utah County.

FM radio reception will be relatively unaffected by this or any other line. FM radio circuits inherently eliminate noise such as vehicle ignition, electric shavers, and any form of power line noise.

It is to be understood that electronic or electrical devices

can operate near the line and function normally. There has not been any cases reported where electrical or electronic devices were abnormal in their operation due to transmission lines of this voltage.

As indicated earlier, Utah Power & Light Company normally will purchase the right-of-way in fee. This can be done only if the owner is willing to sell which presupposes that the offer to purchase by Utah Power & Light Company is considered fair and equitable by the seller. An electric utility cannot by law force an owner to sell his property for a transmission line right-of-way. The utility can only legally obtain an easement or right to build a line across the property. If the owner prefers to retain the fee title to the land and grant only an easement, he will receive fair compensation for the easement and if he so chooses is entitled to have that amount determined by a jury composed of local citizens.

In addition to the above considerations, a cost estimate was prepared to underground approximately three miles of the line. An equivalent double circuit underground line would cost approximately twelve times as much ($12.5 million dollars for the three mile underground section) as the overhead line. This makes the underground consideration prohibitive costly.

Favoring the "middle route" was the consideration that only approximately six homes would be within the right-of-way whereas the "freeway route" would affect twenty-two homes. Far overshadowing this consideration, however, was the concern for human safety to pilots and users of the airport. The additional margin of safety afforded to users of the Provo Municipal Airport seemed in the judgment of Utah Power &

Light Company, to have greater importance than the lesser cost (approximately $250,000 less) of the "middle route" and greater importance than the displacement of more homes along the "freeway route". A secondary consideration was the utilization of an established corridor (I-15 freeway) and the reduction of right-of-way width to 60 feet along the freeway by choosing the "freeway route". The desirability of corridoring when all factors are compatible is discussed in a corridor discussion prepared for BLM in 1974. One of the conclusions states: "It has been the common practice to consider corridoring other kinds of utilities and transportation systems and electric transmission lines with other lines and with other systems". The "Environmental Guidelines" produced in 1971 by members of universities, government agencies and western electric utilities states: "Experience has indicated that new freeway routes often follow existing transmission line rights of way without serious impairment of environmental values. Governmental agencies and utilities should consider the mutual benefits of the joint use of such airspace when requirements for lines arise adjacent to existing freeways". Also, "When planning alignments parallel to highways, consideration should be given to placing the structures within the road right-of-way rather than several hundred feet away. This will lessen the visual impact and physical infringement on the landscape". Accordingly, in a public meeting of the Provo City Commission on August 12, 1976, Utah Power & Light Company announced their decision to follow the "freeway route". This decision was unanimously supported by the Provo City Commission. The minutes of this meeting stated: "Each of the Commissioners and the Mayor, stated that they had studied the matter of the best location for the 345 Kv lines, that would

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SEPTEMBER 16, 1976
GBW/ct

TABLE 1-10

TOWERS PROPOSED FOR TRANSMISSION LINES

TYPE	USE	NUMBER OF TOWERS: EMERY-SPANISH FORK CANYON	SPANISH FORK-CAMP WILLIAMS*	EMERY-SALINA CANYON-SIGURD	SIGURD CAMP WILLIAMS
'angent ("H" Frame)	Straight Sections	277	0	354	593
:angent (Steel Pole)	Straight Sections	0	153	0	0
3 Pole Angle	At Turns	44	0	32	25
1 Pole Angle	At Turns	0	27	0	0
3 Pole Deadend	Vertical Uplift	30	0	41	25
;elf-Supporting	Stress & Long Spans	10	0	50	0
)ouble Circuit	Six Pairs of Conductors	0	0	63	0

*SEE TABLE OF ALTERNATES

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-10-

better serve the entire community, and that they had a great deal of imput from public hearings, and from experts, and that no special interest groups had influenced them in their judgment, but they looked at it on a rational basis and not an emotional way, and it was their opinion that the best route, in this case, would be the "freeway route".

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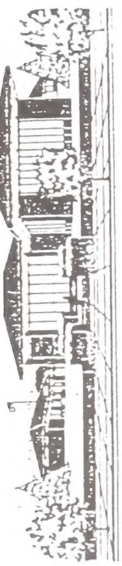

City of Provo

CITY CENTER PROVO, UTAH 84601

CITY COMMISSION

March 5, 1976

Mr. John S. Anderson
Sr. Vice President
Utah Power and Light Co.
1407 West North Temple
Salt Lake City, Utah 84110

Dear Mr. Anderson:

Enclosed is the resolution supporting the proposed alignment of the new 345 K.V. power line in a location immediately adjacent to the west side of the Interstate 15 freeway.

As in any endeavor involving a large number of agencies, it has taken some time to arrive at concensus. However, I now feel that we have achieved a unity that will enable us to proceed with excellent support for this proposal.

We appreciate the cooperation and assistance of Utah Power and Light in this matter, and look forward to working with you in the future.

Sincerely yours,

J. Earl Wignall

J. Earl Wignall
City Commissioner

DFG/lm

Enclosure

J. EARL WIGNALL, Commissioner | RUSSELL D. GRANGE, Mayor | E. ODELL MINER, Commissioner

14

TOWERS PROPOSED

ALTERNATES FOR SPANISH FORK-CAMP WILLIAMS SECTION

TYPE	USE	FREEWAY ROUTE	MIDDLE ROUTE (BETWEEN FREEWAY & AIRPORT)	WEST SIDE OF UTAH LAKE ROUTE
angent (Single Pole Steel)	Straight Line	153	161	284
ngle (Single Pole Steel)	At Turns	27	23	14

Length (Miles)	35.3	36.1	57.9
Homes in Right-of-Way	22	6	0
Tons of Steel	3,706	3,724	5,708

A route that passes on the west side of Utah Lake is being considered; however, certain aspects of this route should be pointed out.

This route is 22 miles longer than the routes considered on the east side of the lake and this additional length w reduce the transfer capabilities of the line by 100 megawatts. The 22 miles of additional length will also add $7,000,000.00 to the cost of construction.

The anticipated load growth on the east side of Utah Lake will require a 345 Kv line into the Geneva-Orem area in approximately 10 years. If the transmission line is on the west side of the lake it will require another 345 Kv line to be built from Camp Williams to the Orem area - a distance of 18.5 miles at a 1977 cost of $7,600,000.00.

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JOINT RESOLUTION

A JOINT RESOLUTION OF VARIOUS AGENCIES AFFILIATED WITH THE ENVIRONS OF PROVO CITY AND UTAH COUNTY RELATED TO THE LOCATION OF A 345 KV POWER TRANSMISSION LINE PROPOSED BY UTAH POWER AND LIGHT COMPANY TO BE LOCATED IN AN AREA GENERALLY EAST OF UTAH LAKE AND WEST OF THE INTERSTATE 15 FREEWAY THROUGH PROVO CITY, UTAH COUNTY, AND OTHER JURISDICTIONS.

WHEREAS Utah Power and Light Company is proposing to locate a 345 KV power transmission line through areas of Utah Valley which fall within the jurisdiction of Provo City and Utah County and;

WHEREAS said high voltage power transmission line would be located in a corridor subject to significant residential, industrial and other related urban growth during the next several decades and;

WHEREAS the location of said power line would have a significant impact on the development of this corridor including a potential detrimental effect on land use planning, property values, community aesthetics and the physical and social environment, and;

WHEREAS the location of said power line could also have a major impact upon the development and utilization of the Provo City Municipal Airport by significantly raising the altitudes required for landings and effecting the safety of aircraft in landing or take-off postures under less than optimum conditions, and;

WHEREAS the proper development of the Provo Municipal Airport and the adjacent land areas is critical to the sound economic viability of Provo City and Utah County, now;

THEREFORE BE IT RESOLVED THAT the below listed agencies do request that Utah Power and Light Company place said high voltage transmission line in a location immediately adjacent to the west line of the right-of-way of the Interstate 15 Freeway (Alternate #3) and that the location of said power line remain in a location along the freeway through the environs of Provo City, and additionally remain along the freeway alignment extending as far to the north as practical and possible, and;

BE IT FURTHER RESOLVED that said below named agencies shall support said alignment along the west side of the Interstate 15 Freeway and will aid Utah Power and Light Company in every way possible to make said alignment practical and feasible for the final construction of the power line.

14

RESOLVED AND ATTESTED TO ON THE DATES BELOW INDICATED.

UTAH COUNTY COMMISSION:

Verl J. Stone

Verl Stone, Chairman

ATTEST:

Patricia ? Whiting

County Clerk (Deputy)

PROVO CITY COMMISSION

Russell D. Grange

Russell D. Grange, Mayor

ATTEST:

Jean Eklund

City Recorder Deputy

PROVO CITY PLANNING COMMISSION

Charles Henson

Charles Henson, Chairman

ATTEST:

Shelly M. Harding

Secretary

PROVO CITY AIRPORT BOARD

Lowell Christensen

Lowell Christensen, Chairman

UTAH COUNTY PLANNING COMMISSION

Keith J. Richan

Keith J. Richan, Chairman

CHAMBER OF COMMERCE AVIATION COMMITTEE

James H. Polve

James Polve, Chairman

PROVO CHAMBER OF COMMERCE

Delbert R Warner

Delbert Warner, President

14

ORDER OF DAEDALIANS

FLIGHT #32 · PIONEER FLIGHT
HILL AIR FORCE BASE, UTAH 84406

February 26, 1976

PRESIDENT

Mr. E. Allen Hunter, President
Utah Power and Light Company
1407 West North Temple
Salt Lake City, UT 84116

Dear Mr. Hunter:

The Order of Daedalians is a national organization of pilots who have been commissioned as heavier-than-air pilots in one of the branches of the United States Armed Services. Pioneer Flight #32 is the Utah contingent of this fraternal organization. The total flying experience, both military and civilian, of Pioneer Flight members is more than any other aviation-oriented organization in the State of Utah. This experience ranges through all military aircraft from helicopters to heavy bombardment, and in civil aircraft from single engine light planes to commercial jet airliners. Thus our roster does include airline pilots, military pilots and civil pilots. This group's aggregate air experience, under most diverse conditions throughout the world, is well over one half million (500,000) flying hours.

Since its inception in 1934, one of the primary goals of the Order has been to ensure all aspects of flight safety. Two of the most coveted aviation awards of the nation are those given annually by the Order for flight safety acts in the military aviation field and civil commercial air carrier field.

This basic tenet of the Order of Daedalians, enhancement of flight safety, has caused the Pioneer Flight to investigate the alleged potential flight safety hazards at Provo Municipal Airport which will be caused by your company's currently planned construction near that airport. We have concluded that the public proposal of construction now submitted by Utah Power and Light Company would be so dangerously hazardous to all aircraft approaching Provo Municipal Airport that it must be precluded from further consideration by either Utah Power and Light Company or any responsible government agency.

However, we recognize that there is a valid requirement for improved services by your company for the public good. Pioneer Flight #32 of the Order of Daedalians therefore suggests that a more practical and realistic approach for construction can and must be given most serious consideration by all parties concerned. We firmly believe that the attached Resolution is the only correct solution that will serve the interests of both flight safety and industrial growth.

(continued)

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We respectfully request that you implement the proposed actions set forth in this accompanying Resolution adopted by the Pioneer Flight of the Order of Daedalians.

We are aware that the construction changes required by Paragraph 5 of this Resolution might incur slight additional costs, but it would be an unconscionable act on our part, your part, or on the part of any responsible government agency be it county, state, or federal, to allow the lives of pilots or passengers to be placed in jeopardy for the sake of these very few dollars. The life of just one pilot is worth much, much more to all of us.

We hope for your fullest consideration of our proposal and acceptance of our Resolution.

Sincerely,

Loyal W. Fry

Loyal W. Fry
Flight Captain
Pioneer Flight
Order of Daedalians

LWF:sj

Copies to:
1. Mayor of Provo
2. Utah County Commission
3. Utah Public Service Commission
4. Utah State Aeronautical Director
5. Manager, Provo Airport
6. Utah County Attorney
7. Utah State Attorney General
8. Provo City Attorney
9. Adjutant General, State of Utah
10. FAA Regional Office for Utah
11. Utah Pilots Association

14

RESOLUTION

A RESOLUTION OF THE ORDER OF DAEDALIANS SUPPORTING LOCATION OF A 345 KV HIGH TENSION POWER LINE AS PROPOSED BY ALTERNATE #3 OF UTAH POWER AND LIGHT COMPANY.

WHEREAS a 345 KV power line has been proposed by the Utah Power and Light Company to be located near the Provo Municipal Airport, and;

WHEREAS said location could significantly raise the minimum approach altitudes on some runways at said airport, and significantly affect flight safety in circling landing patterns, and;

WHEREAS said power line location could affect flight safety in both landing and takeoff postures under less than optimum flying conditions, and;

WHEREAS the Order of Daedalians is committed to promoting flight safety in the air corridors of the nation now;

BE IT RESOLVED THAT the Order of Daedalians, Pioneer Flight, Flight No. 32 does support a location of the proposed power line along the west boundary of the Interstate 15 freeway in the vicinity of Provo City and extending north along the boundary of the freeway as far as feasible and possible, and;

BE IT FURTHER RESOLVED that said Flight No. 32 does request the Utah Power and Light Company to select said alignment for the construction of said 345 KV Transmission line in the vici.. / of the Provo Municipal Airport.

RESOLVED AND ATTESTED ON THIS 19 DAY OF FEBRUARY 1976.

ORDER OF DAEDALIANS
PIONEER FLIGHT
Flight No. 32
Hill Air Force Base, Utah

Loyal W. Fry
Loyal W. Fry
Flight Captain

14

[illegible] USAF Ret.
[illegible] Col USAF Ret
Austin A. [illegible] Col USAF Ret
Ted [illegible] Col USAF Ret
Loyal W. Fry Col USAF (Ret)
John R. [illegible] BG USAF
[illegible] Lt Col USAF.
R. G. [illegible] Lt Col USAF
Ralph [illegible] Lt Col USAF
Richard [illegible] Bates Capt USAF
Joseph [illegible] Maj USAF
Robert C. Smith Maj USAF transferee from Harold Clark flt Clark AB Philippines
William [illegible] Col USAF (Ret)
Dennis [illegible] Maj USAF
[illegible] H. Allred [illegible] USAF Ret.
[illegible] B/G AF Ret
Melvin E. Jarvis Col USAF (Ret)
Frank E. [illegible]
Lloyd [illegible]
[illegible] B/Gen. U.S.A.F. Ret.
[illegible] Col, USAF (Ret)
[illegible] Col USAF (Ret)
[illegible] Lt Col USAF
[illegible] Reynolds
Russell [illegible]
[illegible]
W. S. [illegible]

14

ATTACHMENT NO. 3

September 18, 1976
DCG/s

EMERY SOLID WASTE VOLUMES
(80% LOAD FACTOR FOR ONE 400 MW UNIT)

Scrubber Sludge:	216 T/day 79,000 T/year
Ash:	312 T/year 114,000 T/year
Total Solids:	193,000 T/year
For a 35 Year Plant Life:	6,755,000 Tons

EPA 650/2-73-038 Gives Packing Volumes Of:

Ash:	105 lbs/ft^3
Sludge: (dry)	91 lbs/ft^3

Waste is 41% sludge (by weight) and 59% ash, so average density is:

$$\frac{1}{\frac{.41}{91} + \frac{.59}{105}} = 98.8\ lb/ft^3$$

Total volume for 35 year plant life is then:

$$\frac{6.755 \times 10^6 \times 2000}{98.8} = 13.67 \times 10^7\ ft^3$$

$$= 3140 \text{ acre-feet/unit}$$

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ATTACHMENT NO. 4A

May 26, 1976

EMERY PLANT STRUCTURE SIZES
(measured in feet)

Structure	Width	Depth	Height
Unit #1 and Unit #2 - Overall	528	300	231'8"
Boiler	272	120	218
Deaerator	272	59	155
Turbine-Generator	272	105	105
1. Adminitration Bldg.	125	55	14'3"
2. Adm. Warehouse & Shop	203'1"	127'8"	34"
3. Precipitator #1 & #2			
Overall incl. Ductwork	221	99'	90
Electrostatic Section	221	54	90
Control Room	136	45	18'6"
4. Water Treatment Bldg.	120	90	41
5. Lime Softeners	(2 ea.) 90' dia.	--	30
	(1 ea.) 31' dia.	--	30
6. Raw Water Pumphouse	80	33	15
7. Clearwell Pumphouse	50	30	15
8. Sewage Treatment Bldg.	25	60	9'5"
9. Fuel Oil Tanks	(3 ea.) 22	--	28'6"
10. Fly Ash Silos	(2 ea.) 32' dia.	--	97
11. Dewatering Bins	(2 ea.) 35 dia.	--	76
12. Settling Tank	40 dia.	--	31
13. Surge Tank	52 dia.	--	37
14. Ash Water Storage Tank	32'8"	--	30
15. Ash Water Pumphouse	92'8"	44'8"	20'10"
16. Transfer Bldg.	36	36	86
17. Construction Warehouse	(2 ea.) 200	60	20
18. Construction Office	120	80	16
19. Construction Shop	65	60	30
20. Sanitary Facility	17'5"	13'6"	12
21. Unit #1 Cooling Tower	361'	52'	58'
22. Unit #2 Cooling Tower	361'	52'	58'
23. Cooling Tower Control Bldg.	(2 ea.) 26'8"	40'8"	13
24. Chemical Treatment Bldg.	61' + 30' Tank=91'	24'8"	17
25. Coal Receiving Bldg.	83	50	102'
26. Condensate Storage Tanks	(4 ea.) 22	--	26
27. Remote Switch Gear Bldg.	91'8"	102'8"	18
28. Paint Shop	26	38	13
29. Cooling Tower Blowdown Sump Str.	88	52	Below Ground Level
30. Fuel Oil & Lube Oil Pump Bldg. A5-4	22'8"	62'8"	14
31. Hydrogen Bldg. A6-2	38	31'8"	15'2.5"
32. Ash Silo Enclosure A7-2	82	39	36
33. Raw H_2O Surge Tank Control Bldg.	41'4"	21'4"	18'10"
34. Demineralizer Make-up Tank No. 1	28' dia.	--	30
35. Raw Water Surge Tank	15'6"	--	17'9"

Note: Dimensions are from Architectial Drawings where available, otherwise, they are from preliminary drawings. Where dimensions are not yet available, the space has been left blank.

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May 26, 1976

ATTACHMENT NO. 4B

EMERY PLANT POND SIZES

POND	AREA	CAPACITY
7. Raw water basin 1,100' x 700' (max dim)	10 ½ acre	150 acre ft
9. Clearwell 300' x 200' x 10' deep	60,000 ft^2	
11. Polishing Pond 95' x 70'	6,650 ft^2	
37. Batch Water Pond 144' x 144'	20,736 ft^2	
38. Coal Yard Evaporation Pond 1000' x 340' (mas dim)	7 acre	
41. Circulation Water Holding Basin 260' x 480'	2 7/8 acre	11.45 acre ft
42. Evaporation Basin 1680' x 960'	37 acre	
46. Cooling Tower Blowdown Basin	3 ½ acre	

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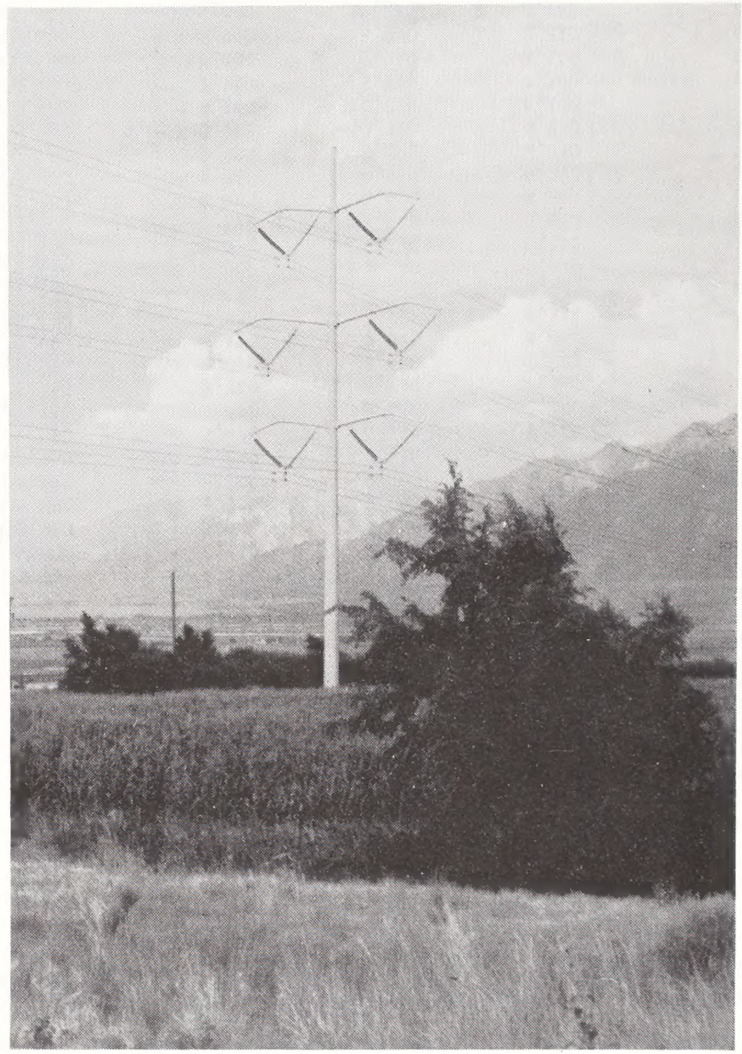

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ATTACHMENT NO. 7

EMERY SITE WATER ANALYSIS
PARAMETER Dissolved Solids mg/1

Date	Rock Canyon Above Site	Rock Canyon Below Site	Johnson Bench Above Site	001 Discharge	002 Discharge
6-16-74					
9-27-74	3,450				
11-21-74	4,560				
1-17-75	4,270			5,220	
3-4-75	4,570		7,420	8,390	9,310
3-18-75	4,270		8,800	8,450	9,705
4-4-75	5,985		10,775	8,670	10,300
4-12-75	5,465	6,560	6,440	7,455	7,065
4-16-75	3,335	3,925	11,210	8,590	10,590
4-24-75	2,110	1,950	11,290	8,550	10,550
4-28-75	1,700	1,880	10,280	8,575	10,370
4-28-75	4,925	5,410	11,790	8,560	10,570
5-2-75	6,195	3,635	8,215	8,640	10,590
5-5-75	1,370	2,205	4,670	8,620	10,725
5-8-75	2,745	3,425	4,095	8,290	10,340
7-23-75	1,750	1,750	1,250	5,880	7,300
11-5-75	5,330	4,610	4,725	7,390	8,650
12-3-75	5,360	5,530	9,420	7,780	9,240
11-20-75	5,820	5,200	9,950	7,550	8,870
12-10-75	5,120	5,240	9,200	4,600	7,630
12-17-75	5,940	5,860	9,410	7,710	9,300
12-26-75	6,180	5,470	4,850	6,180	8,090
12-31-75	5,710	4,590	2,460	8,040	9,940
1-7-76	5,580	5,310	5,120	7,840	9,880
1-14-76	5,510	4,810	3,040	1,930	9,880
1-22-76	5,690	5,410	2,045	8,060	9,930
1-28-76	5,420	4,930		8,110	9,990
2-4-76	5,585	5,425		8,035	10,260
2-12-76	5,870	5,650	3,530	7,970	10,170
2-19-76	6,290	5,570	4,700	8,160	10,430
2-25-76	5,500	5,170	3,610	8,060	10,210
3-10-76	5,700	4,065	2,420	8,310	10,420
3-17-76	5,860	5,560	4,500	8,220	10,350
3-24-76	5,860	6,320	9,390	8,050	10,270
3-31-76	5,515	6,050	10,320	8,250	10,490
4-7-76	6,410	6,200	10,870	8,120	10,180
4-15-76	8,170	7,250	5,540	7,790	10,170
4-21-76	6,450	7,050	9,940	8,140	10,680
4-28-76	5,800	6,940	8,380	8,210	10,710
5-5-76	6,240	6,820	10,380	8,240	10,720

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ATTACHMENT NO. 6

September 18, 1976
KN/s

ESTIMATED STACK EMISSIONS (830 MW)
WITH 80% SO_2 REMOVAL

Major Constituents	Coal From Hiawatha Seam ppm by Vol.	Tons Per Day 415 mw	Tons Per Day 830 mw	Coal From Blind Canyon Seam ppm by Vol.	Tons Per Day 415 mw	Tons Per Day 830 mw
CO_2	136,101	10,187	20,374	134,062	9,948	19,896
H_2O	67,250	2,060	4,120	69,154	2,085	4,170
N_2	754,636	35,944	71,888	754,953	36,107	72,214
O_2	41,146	2,239	4,478	41,073	2,209	4,418
SO_x (as SO_2)*	83	9.0	18.0	62	6.6	13.2
NO_x (as NO_2)	450	36.0	72.0	450	35.3	70.6
Ash (with 99.5% efficient precipitator)		1.4	2.8		0.9	0.8

*With 80% removal

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FLOW DATA
EMERY DEWATERING PIPELINES

Date	Ga. Ht.	Trench #1 CFS	GPD	Ga. Ht.	Trench #2 CFS	GPD
2/11/75				.215	.055	35,530
2/12/75				.240	.072	46,512
2/13/75				.420	.289	186,694
2/14/75				.440	.324	209,304
2/18/75				.320	.147	94,962
2/19/75				.320		
2/20/75				.320		
2/21/75				.320		
2/25/75				.340	.171	110,466
2/26/75				.320	.147	94,962
2/27/75				.320		
3/3/75				.300	.125	80,750
3/4/75				.280	.106	68,476
3/5/75				.280		
3/6/75				.280		
3/7/75				.280		
3/10/75				.260	.088	56,848
3/11/75				.260		
3/12/75				.260		
3/13/75				.260		
3/17/75				.240	.072	46,512
3/18/75				.250	.080	51,680
3/19/75	.240	.072	46,512	.250	.080	51,680
3/20/75	.240			.240	.072	46,512
3/21/75	.240			.240		
3/24/75	.240			.240		
3/25/75	.220	.058	37,418	.240		
3/26/75	.220			.240		
3/27/75	.220			.240		
3/28/75	.220			.240		
3/31/75	.200	.046	29,719	.220	.058	37,418
4/1/75	.200			.220		
4/2/75	.200			.220		
4/3/75	.200			.220		
4/4/75	.200			.200		
4/7/75	.220	.058	37,418	.220		
4/8/75	.220			.220		
4/9/75	.220			.220		

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Date	Ga. Ht	Trench #1 CFS	GPD	Ga. Ht.	Trench #2 CFS	GPD
4/10/75	.220			.220		
4/11/75	.220			.220		
4/14/75	.220			High water		
4/15/75	.220			-		
4/16/75	.220			.198	.045	29,070
4/17/75	.220			.198		
4/18/75	.220			.198		
4/21/75	.220			.198		
4/22/75	.220			.198		
4/23/75	.220			.200	.046	29,719
4/24/75	.200			.198		
4/25/75	.200			.198		
4/28/75	.200			.198		
4/29/75	.200			.198		
4/30/75	.200			.198		
5/1/75	.200			.180	.036	23,256
5/2/75	.240	.072	46,512	.180		
5/5/75	.240			.200	.046	29,719
5/6/75	.240			-		
5/7/75	.220	.058	37,418	.200		
5/8/75	.220			.200		
5/9/75	.220			.180	.036	23,256
5/12/75	.230	.065	41,990	.190	.041	26,486
5/13/75	.220			.180		
5/14/75	.220			.180		
5/15/75	.220			.180		
5/16/75	.220			.180		
5/19/75	.220			.180		
5/20/75	.220			.180		
5/21/75	.220			.180		
5/22/75	.220			.180		
5/23/75	.220			.180		
5/27/75	.240			Water backed		
5/28/75	.240			into weir		
5/29/75	.240					
5/30/75	.240					
6/2/75	.260	.088	56,848	High water		
6/3/75	.320	.147	94,962			
6/2/75	.360	.197	127,262			
6/5/75	.360					
6/6/75	.400	.256	165,376			
6/9/75	.500	.445	287,470	.220	.058	37,418
6/10/75	.560	.590	381,140	.220		
6/11/75				.220		
6/12/75	Weir washed out			.220		

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	Trench #1			Trench #2		
Date	Ga. Ht.	CFS	GPD	Ga. Ht.	CFS	GPD
6/13/75	Weir washed out			.220		
6/16/75				.220		
6/17/75				.220		
6/18/75				.180	.036	23,256
6/19/75				.180		
6/20/75				.180		
6/23/75				.180		
6/24/75				.180		
6/25/75				.180		
6/26/75				.180		
6/27/75				.180		
6/30/75				.220	.058	37,418
7/1/75				.220		
7/2/75				.220		
7/3/75				.220		
7/7/75				.220		
7/8/75	.320			.220		
7/9/75	.320			.220		
7/10/75	.320			Hi water		
7/11/75	.320			Hi water		
7/14/75	.300			.220		
7/15/75	.300			.220		

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CLARON E. NELSON, PH.D.
PROFESSOR OF ECONOMICS
THE UNIVERSITY OF UTAH
SALT LAKE CITY, UTAH 84112

DEPT OF INTERIOR
BUR OF LAND MGMT

'76 SEP 20 AM 10:00

RECEIVED
UTAH STATE OFFICE
SALT LAKE CITY, UTAH

September 19, 1976

Paul L. Howard
Utah State Director
Bureau of Land Management
U.S. Department of the Interior
Salt Lake City, Utah 84111

Dear Mr. Howard:

I have examined the Draft Environmental Statement for the Emery Power Plant and would like the following comments to become part of the record.

Examination of the DES reveals no economic or other justifications for construction of the Emery plant except possibly as a source of energy for areas in other states. There is nothing which indicates that this facility either economically or environmentally is the most desirable alternative source for power to be used in the states of Nevada, Arizona, Montana and Washington. The National Environmental Policy Act states (Sec. 102) that alternatives to the proposed action will be included in every report significantly affecting the quality of the human environment. The very preparation of the DES attests to the significance of the environmental impacts.

The 1975 Annual Report of Utah Power & Light Company provides data which clearly indicates that the expansion is intended for export. The 1975 sales for resale were 2224 percent of 1970 sales for resale. Considering UP&L system sales to residential, commercial and industrial customers plus a growth for resale based upon the increases of the other components, the 1975 kwh generated exceeded the sales by 5 percent. Note that 1970 generation was approximately 86 percent of sales. Using the 1975 company ratio between electric capability and sales, the addition of the Huntington 2nd unit (scheduled for 1977) would provide for 39 percent expansion of demand within the UP&L marketing area. The actual sales increase from 1970 through 1975 was 45 percent for these customers classes. On page 1 - 115 of the DES, the company projects an almost identical normal load growth between 1975 and 1980.

The UP&L projection relates to another serious deficiency of the report. The Company assertion that there will be a specified increase is not a substitute for a demand study. There is no evidence in the DES that such a study has been made and inquiries to BLM personnel has

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provided no additional evidence. A prudent businessman faced with competition would always make a careful demand analysis, relating quantities and prices. The monopoly and cost-plus relationships of the utility does not make this essential for the firm's economic welfare. However, public welfare considerations clearly require such a study before resources are invested in something which may not be needed. There is evidence that price increases and public actions are reducing demand for household electricity. A Survey of Household Energy Use, 1973 and 1975 prepared by the Washington Center for Metropolitan Studies indicates that the average annual BTU's per household in the Western Region declined by 9.6 percent during the period. A longer time period associated with prices increasing at a relatively higher rate than those for other commodities will permit greater adjustments on household demand for electricity.

Possibly a third serious deficiency is related to the fostering and promoting of the general welfare provision of Sec. 101 of NEPA. The newer generating units are larger and operationally more efficient. However, this does not necessarily mean that the generation and distribution costs are lower. There is some evidence that unit costs ($/kwh) are higher (research is being conducted) because of increasing construction and financing costs. If higher cost per unit facilities are added to the UP&L system and then operating maintenance and capacity costs are not fully charged to resale customers, the existing local customers will be subsidizing the out-of-state markets. This certainly would not promote the welfare of the residents within the UP&L system area. To the extent expansion is required to meet peak loads, there are alternatives to the very high capital cost steam generating facilities. These matters are not discussed in the DES.

It appears to me that the general welfare provision of NEPA imposes a responsibility on the resource management agencies to evaluate the local, regional and national effects of actions. The evironmental impact statements should demonstrate that these factors have been adequately considered.

Sincerely yours,

Claron E. Nelson

Claron E. Nelson

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Federal Building, Room 2215
125 S. State Street
Salt Lake City, Utah 84138

In reply refer to:
LWP

September 17, 1976

Memorandum

To: State Director
Bureau of Land Management
Salt Lake City, Utah

From: Area Manager
U. S. Fish and Wildlife Service
Salt Lake City, Utah

Subject: Emery Power Project, Utah - Review of Draft Environmental Statement

The Fish and Wildlife Service has reviewed the Draft Environmental Statement prepared by Bureau of Land Management on the Emery Power Project.

Most impacts on fish and wildlife have been adequately covered. However, several comments submitted June 21, 1976 on the preliminary draft have not been incorporated in the official draft. We believe the comments are still valid and are again offered for your consideration.

Chapter 3, page 46, 2nd paragraph

Brown trout are a species capable of maintaining adequate population levels under heavy fishing pressure. It is not expected that the German brown trout in these waters would be over-fished.

Add: However, fishing would become more competitive and less rewarding to the fisherman.

Chapter 3, page 47

3. Threatened and Endangered Species
Sighting of the American peregrine falcon, an endangered species, are too infrequent to form a basis for determining impacts resulting from the project.

The peregrine falcon has highly specialized habitat requirements for successful reproduction. Historic eyries, though unused at present because of low population, are important to restoration of the species. The presence or absence of any known historic eyries should be noted.

Chapter 3, page 66, paragraph 3

Also, an additional 2,700 visitor days of big game hunting would be expected to increase the harvest of mule deer by 360 to 600 annually.

Add: Most deer herds in Utah are already hunted to capacity. Therefore, 360-600 additional deer might not be available. In this case, the additional 2,700 man-days of hunting would be accommodated at the expense of lowered hunter success and more competitive hunting conditions.

Chapter 3, page 68, first full paragraph

The fracturing could dry up springs located above the mine which are now providing water for 500 head of cattle permitted to graze the area from June through September. The area cannot be grazed without water. Thus, approximately 2,900 AUM's of forage would be lost, representing a loss of beef production equivalent to an annual consumption of 550 persons. This would be a permanent impact since the springs could never be restored.

Impacts on wildlife from drying up of the springs should also be addressed in the wildlife section.

Chapter 8, page 28-(6) Wildlife

The Escalante River from Calf Creek to Lake Powell does not

the wide fluctuations in flow and the high level of suspended sediment (Iorna, 1968: USDI, 1976). The proposed reservoir would be located half way between Calf Creek and Lake Powell.

The above statement is not correct. Suggest it be revised to read:

The Escalante River from Calf Creek to Lake Powell fluctuates widely and contains few game fish. However, ten species of fish, primarily suckers, chubs, shiners and dace, occur in this stream segment. Frogs and other amphibians also exist in the streamside habitat.

The comparatively lush vegetation of the canyon bottom supports good populations of small mammals. This, together with abundant cliff nesting sites in the canyon walls, makes the Escalante River important habitat for eagles and other raptors.

Fifty Mile Mountain south of the Garfield plant sites has been designated as a potential area for reintroduction of desert bighorn by the Utah State Division of Wildlife.

We realize that discussion of wildlife in the alternate sites is largely academic since the plant is already under construction. However, to set the record straight for any other proposals that may be made in the future for this site, it should be made clear that the Escalante River is not barren of aquatic life.

Chapter 8, Page 182

To date, success of the drive toward household and industrial conservation is random and individualized. There is no indication that these measures would be implemented in UP&L's market area to such a degree that further power development not be planned.

Suggest addition of a sentence:

Development of additional power by the project would make initiation of needed energy conservation measures even more difficult and less

likely by removing the incentive, thus setting up a vicious cycle that would perpetuate the ever increasing demand trend.

The opportunity to offer these comments is appreciated. If we can be of further assistance, please advise.

Robert H. Shields

17

721-2nd Ave
Salt Lake City
Utah 84103

18 September 1976

Bureau of Land Management
850 North Main Street
Richfield
Utah 84701

Dear Sir:

Concerning the draft environmental impact statement on the proposed and under-construction Emery Power Project.

I have heard that some of the ranchers in southwestern Utah complain about a more and more recurring event, possibly associated with the steam from power plants. During the winter the steam condenses on the vegetation and freezes. This prevents the cattle from forageing (along with the wildlife). This problem I could not find addressed to in the IS.

There has been many reference to Off-road vehicle activity and the predicted increase by 12 % because of the power plant. Yet the mining activity associated with the power plant is but a fraction of the total projected mining activity (Table 2-18) (600 for Emery out of 4676 total new employees to the two county area. Using the data in Table 2-18, once could anticipate a 96% increase in the off-road vehicle use due to the total mining activity. Yet referene to overcrowding in the recreation sites (Table 2-12) indicates disaster will strike such scenic areas as the San Rafael (or the Escalante, if that alternative is selected). In mitigating the problems associated with the power plant, no mention is made to mitigate this extensive overuse of a highly fragil region as the San Rafael. Most of the San Rafael is under the BLM jurisdiction. Will there be more campgrounds? Will there be prohibitions of ORV in the region? Will there be an increase in law-enforcing agents (federal) and naturalist's to guard the public lands from rape? Will there be the proposed primitive areas established? I think that it is time that the BLM begin to pull personnel off from energy development and balance the show by putting more on to protection of public lands.

On page 3-41, it is mentioned that "the salt would not impact game fisheries since none exist downstream from these towns". I am very interested in the non-game fishes that exist in the San Rafael River and tributaries, and likewise in the Escalante River should that alternative be selected. Will the salt affect the non-game fishes?

In discussing the Garfield sites as alternatives, perhaps not enough mention has been made of the National importance to many people

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that the Escalante River drainage is. n There is no mention, for instance, of how many people who now hike the Escalante River from the highway down to Coyote Creek, could hike that section with a reservoir in it. Although the loss of riparian habitat would represent less that 10 percent of the total habitat in the Escalante River drainage (Page 8-40,41), certainly a far greater loss of riparian habitat would occur to PRESENT recreation backpackers and survival training groups. In short, the Garfield sites are not alternatives and UP &L would probably agree, but for a different reason (It is considered to be a site in its own right).

In several places there is mention of the median family income in the various counties and all the counties listed have a median income below the state average. Several other line of statistics oas th percent of population below the pverty level are usually listed also. One should mention that these are rural populations and rural populations usually have a median family income below the urban average. However, the net-worth of a family in a rural area may well be much more than the net-worth of a family in the urban setting. The rancher has a heavy investment in land, machines, and livestocks. The urban dweller has no heavy investments. Income averages are quite misleading and so are percent of unemployment and percent of population below the poverty level. The cost of living in rural areas is usually lower than urban areas. The state averages are high since most of the people of Utah live in Urban areas.

There is mention of solar and wind energy (8-174,176), and the description accompaning them is perhaps misleading and perhaps comes from either Washington or UP &L. There is only mention of the far-cut facets of solar and wind that only big business could provide (and the energy mining companies and States that depend on energy mining company royalties would fight until all the energy is mined out of the earth).. Presently there is technology to heat by solar energy and provide limited electicity by wind. Such small business is not encouraged by the powers that be. It seems that UP &L and Washington want us to heat our water twice- once at the plant site (up to 1000 F) and again on the kitchen range (212 F).

There is one complaint I have in the draft EIS. Your map as the one on page 2-55 shows the area of concern. The Emery site is almost off the map. Perhaps there would be more concern with the San Rafael region if that were also included on the above such maps.

Sincerely,
Peter Hovingh
Peter Hovingh

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United States Department of the Interior
BUREAU OF OUTDOOR RECREATION
MID-CONTINENT REGION

MAILING ADDRESS:
Post Office Box 25387
Denver Federal Center
Denver, Colorado 80225

STREET LOCATION:
603 Miller Court
Lakewood, Colorado
Telephone 234-2634

IN REPLY REFER TO:
E30

SEP 17 1976

MEMORANDUM

To: District Manager, Bureau of Land Management, Richfield, Utah

From: Assistant Regional Director, Land Use Coordination

Subject: Review of the draft environmental statement for Emery Power Plant, Emery County, Utah

This is in response to your request for the Bureau's review and comment on the subject draft statement. The document has briefly identified major areas of conflict between the project and recreational pursuits. In our letter of June 22, 1976, we provided several specific comments on a preliminary copy of the draft. We believe that the majority of these comments are still valid. We hope to see a positive response to these comments in the final statement.

In the above-mentioned letter, we identified those parks and recreation areas which could potentially be impacted by the transmission lines associated with the project. We are unable to find any determination in the draft statement of whether those projects listed will actually be impacted. If it is impractical to include larger scale maps, then the draft should at least list those recreation areas within the zone of visual or actual influence as well as discuss the impacts on those areas.

We note that alternatives of Garfield East and West could deplete 10,000 acre-feet per year of Escalante River water. The Escalante River is included under Section 5(d) of Public Law 90-542. This section requires that in "all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national, wild, scenic and recreational river areas...." The final statement should recognize the free-flowing potentials of the Escalante River and indicate that it is included under Section 5(d) of Public Law 90-542.

Robert J. Arkins

Robert J. Arkins

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

20

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

55 South First East
Richfield, Utah 84701

2720
9/21/76

Bureau of Land Management
Richfield District Office
850 North Main
Richfield, Utah 84701

Gentlemen:

We have reviewed the Draft Environmental Impact Statement for the Emery Power Project and have the following comments.

Page 1-83, Table 1-11

Helicopters will be necessary for erection of towers and stringing conductors and should be added to the table.

Page 1-85, Item (11)

As we stated in our previous comments we do not feel reseeding is sufficient. We believe you should use the term "revegetate" instead of "reseeding."

Page 2-115, Figure II-3-5

The area from mile post 40-44 is a prime elk winter range. In chapter 4 you recommend closing this area to construction activities during the winter months. E-W should be added to the wildlife listing. Brown's Hole is also a prime Elk calving area. E-S should be added for mile post 47-53. This is also identified in chapter 4.

Page 4-7, Item 12

In our previous comments we suggested that this requirement be placed on "some structures" not all structures. The existing line in this area does not have painted towers. In your response of August 19, 1976, you assured us that the wording would be changed. Once again we recommend the wording be; "Prior to construction and coloring of some structures . . . .
. . . . . natural landscape.

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Page 4-7, Item 13

This item implies that every structure must be screened from site of highways. This is impractical and you identified it as an adverse impact in chapter 5. We suggest you rewrite this to reflect the realistic point of view and make it a requirement to attempt to screen all towers rather than a must.

Page 4-10, Item 2.,e.

On the existing line from the Huntington Plant it has been necessary to remove trees of less than 35 inch height to obtain line clearance. We recommend that this statement be changed to read "only vegetation within 20 feet of the conductors would be cleared from the right-of-way along the transmission line corridors, or as necessary for road construction.

We thank you for the opportunity to comment on this Environmental Impact Statement and your consideration of our comments.

Sincerely,

Ralph C. Cisco
Forest Supervisor

cc: D-4

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Emery Environmental Statement

Comments Prepared for the Bureau of Land Management
by Robert H. Hassell; Panguitch, Utah
September 16, 1976

I am pleased to be able to offer my comments on the draft environmental statement of the proposed Emery Project for power generation. While I now live nearly 200 miles from the generating facility under consideration, I have many friends living in the area, as I grew up in Price only a few miles north of the Emery site. Hence, I continue to maintain a lively interest in the future of this area.

I have read the Emery EIS from cover to cover, an accomplishment the need for which is only innumerable pots of tea and a somewhat persistent determination to persevere at a completing a project once it is begun. I also read all of the Kaiparowits EIS, and some comparisons immediately spring to mind. I can see that some learning has taken place between the preparation of these two statements. The authors of the Kaiparowits EIS saw fit to try and overwhelm the public with verbal garbage, most of which was irrelavent to the matter at hand, while at the same time ignoring many vital factors which an EIS should contain. The Emery statement is not perfect by any means, an opinion which my subsequent comments will attempt to substantiate, but at least you have not tried to make your writing look thorough through sheer size. Repetions seem to be minimal, and the project proposal is discussed in a limited but completely relevant way. Thw writing, while uninspired and totally devoid of color, is tight, correct, and unbiased. The appendices chosen seem relevent, and the organization of the statement is light years better than that of the Kaiparowits EIS. I think someone who wants to know the environmental effects posed by the proposal can get a fine idea of those effects by reading the statement. If this be the goal of an EIS, and I think this should be the only goal of these documents, your efforts here may be termed a success.

Before beginning my substantive comments on the EIS itself, I feel compelled to make some observations on the process by which we write and comment on an EIS, with alternatives in full dress review, on a project now more than 50% complete. Now, I realize that this is not the fault of the BLM, or any other federal agency, but what I am going to suggest are some actions which the government can and should take in the future to

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prevent repetitions of this comic-opera scenario. What Utah Power and Light is attempting to do is intimidate the Forest Service, BLM, and the public into approving federal actions by the overwhelming presence of a generation station already sitting on private land. Indeed, if we allow the situation in the future to reach the proportions it has here, the public really has no choices, and approval within very limited alternatives is assured. However, corporations like Utah Power and Light cannot be allowed to run roughshod over the public interest, as UP&L is doing here. What UP&L has done by commencing construction prior to gaining the permitts for its transmission system and transportation network is to determine that the public interest is the same as UP&L's interest, and then to demand that the public see it the same way. In truth, in a democracy it is the people's right to determine their own interests, and in this case the public should take some very concrete actions to determine that in the future its options are not pre-empted. The key to the solution lies in the final paragraph on page 1-105, a part of a letter from the BLM to UP&L which has been reproduced in the statement. It should be made abundantly clear that in the future there will be no preparation of an EIS, or any granting of needed federal permits or easments, if there is any substantive on-site disturbance beyond a preliminary survey before completion of an EIS. I believe that NEPA gives the government the authority to establish such a regulation and make it stick. The fact that UP&L is a publicly licensed utility makes me doubly sure that the law is not on the side of UP&L. I sincerely wish that the BLM had stuck by its threat of June 2, 1975. It could have made a very interesting court case.

The section of the EIS relating to air pollution is a large improvement over the corresponding section of the Kaiparowits EIS, but it is still difficult for the casual reader to find out from the writing exactly what the impacts are. The facts are presented strictly on the basis of the standards set by the National Air Quality Standards, the dirtiest regulation that can be applied. Since the contributions to the ambient air from this source are only small percentages of this standard, the public is assured, I suppose, that this plant is "clean." However, page 3-11 makes it clear that emissions from Emery will exceed Class II standards, which by themselves are far from clean. The air above the Emery site is currently designated Class II, but UP&L seems to feel that the law does not apply in this case. The appendix material on page 8-199 (letter from EPA to UP&L) leaves some room for doubt as to UP&L's legal

position in the matter, but the EIS only evaluates the effect of the plant on Class III standards. I think your figures belong in the EIS, but we also need some comparative statistics relating planned emissions to both Class I and Class II standards. The site is near Arches National Park, Capitol Reef National Park, the Thousand Lake Mountain Wilderness Study Area, and several BLM Primitive Area proposals in the San Rafael Swell. Modification of the standards set in the Clean Air Act in anything like the form now before the House and Senate might have a profound effect on the UP&L proposal, and there is even with the current standards a real question as to whether a start-up without sulpher oxide controls is allowed. Hence, in view of this legal "grey area" (no pun intended) the EIS should compare estimated emissions from Emery with Class I and Class II standards so that those in a position to approve or deny the permitts and easments will know exactly how dirty the air around Emery will be. For example, according to page 3-15 the background concentration of SO_2 is 8 ug/m^3 (24-hr. max.), while the calculated 24-hr. max. concentrations of SO_2 with Emery in operation are somewhere around 200 ug/m^3. That is a 2,500% increase, and NAAQS notwithstanding, this is certainly a significant deterioration of existing clean air.

I find your analysis of the interation of airborn pollution between the Huntington and Emery plants (pages 6-5 and 6-6) somewhat unbelievable. Your analysis concluded that there would be no interation between pollutants from these two plants, even though they are only fifteen miles apart. With visible pollution from the Navajo Plant reaching nearly to the Waterpocket Fold, with infrared photography finding Four Corners pollution at Bryce Canyon, and with Mojave pollution showing up frequently at Cedar Breaks, I find your analysis to have an Alice-In-Wonderland quality. I do not believe your conclusions can be substantiated, and the EIS makes no attempt at doing so. It would be nice to have some maps showing ppm concentrations of SO_2 and NO_x from both Huntington and Emery along the circumferences of concentric circles whose centers are at the plant locations. Several maps with predictions of pollutant concentrations under different dispersal conditions should be included.

I find your secton on the socio-economic impacts of the Emery proposal to be excellent. However, from the reports provided by my old friends still living in the area, your rather cold statistical analysis seems rather remote from the very real drama being acted out in Emery County. Here

we have the fabric of people's lives being quite literally torn apart as a stable, Mormon, rural area is being almost steamrolled into oblivion. It has taken decades to turn any of the land in Emery County into productive farm and range land, and traditionally the small communities most directly affected here have grown up around the farms and rangeland. The key to what success this effort has produced has been the careful husbanding of water and applying it to the land. Now the process is being reversed, and almost overnight the water is being taken off the land, and the green fields of alfalfa and grain are reverting to desert scrub. In fact, one prediction is that we are very close to eliminating all the farms along Ferron Creek. The small communities which have grown up around these farms will either disappear or find themselves converted into bedroom communities for construction workers and coal miners. Comparison of communities like Moore and Emery with their Carbon County cousins like Kenilworth and Wellington shows what a hard change this is going to be. Your prose might very well be altered somewhat to show the human consequences of your nice collection of statistics.

One thing that continually bothers me about most EIS volues is that while they do nicely in projecting monetary benefits from the proposals, they fail woefully short on analysing costs. This EIS is a large improvement over the Kaiparowits EIS in this area, and I appreciate your efforts particularly with regard to impacts on schools. However, you still have a long way to go to reach adequate. What, for example, will be the costs to the public of the necessary road construction for the highways related tt the project? U-10 is simply not built for heavy construction, and it would be interesting to know how much the accelerated deterioration of this road will cost the taxpayers of Utah. How much will the new water and sewer facilities cost the taxpayers in Emery County? Huntington's problems seem to show that the cooperation of UP&L with local government has not been ideal, and we seem far from finding a satisfactory solution to financing these improvements. How long will it be before tax revenues from these projects begin to balance costs, if in fact they ever do? Your EIS makes no attempt to answer these questions and as such is not adequate in its appraisal of impacts in this area.

This EIS does a nice job of evaluating the effects of the proposal on wildlife, and I wish all the deer hunters who harp continually on the declining deer populations could read what you have to say on the loss of winter range and its effects on the deer populations. Every time

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another road is built, a coal mine opened, or a power project approved we loose more wildlife, and increased population puts more pressure on what is left. We must realize that industrialization means the end of many facets of the way of life most of us stay in Utah to enjoy. These trade-offs are inevitable, and the statement in this area does a good job of pointing these out.

This brings us next to the section on alternatives, and there are some serious problems here. First, respecting the consideration of choices, the Garfield sites are offered as alternatives in what seems to be a serious vain, while the Cedar Valley site is dismissed in a very prefunctory fashion because of supposed difficulties getting state approval for a new major pollution source in the area. In view of the rather full treatment given the Garfield alternatives, one might wonder whether the UP&L executives have been living under a rock the last seven years. The water source for the proposal is supposedly the Escalante River, with a dam to be constructed inside the Escalante section of the Glen Canyon National Recreation Area. UP&L's problems obtaining state permitts for the Cedar Valley site would be comparable to their difficulty getting a dam past the Park Service only if one is willing to make comparisons between the difficulty of finger painting to partial differential equations. One Utah official rated the Escalante as "the most sacred of the sacred areas to environmentalists," and surely any attempt to fool around with this stream would result in an outcry making the Kaiparowits controversy look like a junior high school debate. It would seem that UP&L is engaged in a defensive maneuver to make its first choice look good by presenting a major alternative which is totally unacceptable and probably unapprovable as well. Even the water line alternative from Soda Gulch is less than environmentally pure, and a major pollution source within walking distance of the Escalante Wilderness is a horse which just won't run.

Building Huntington Units 3 and 4 looks like an attractive alternative both from an environmental and industrial viewpoint until one realizes that in the mind of the company, both Huntington and Emery are ultimately to have four units each. Hence, this alternative really represents only a "you can pay me now or you can pay me later" choice. The big disadvantage from UP&L's point of view is that any new construction at Huntington will have to involve SO_2 controls, while the rush at the Emery site seems designed to avoid installing scrubbers. So much for the pious platitudes

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spread over the tube extolling corporate concern for the environment! In short, the only serious alternative in the EIS to the proposal is the Sevier Valley site, and the statement should make that clear. I really am wondering why we see no consideration of other sites in Carbon and Emery Counties. What seems to be the case here is that the EIS considers only the alternatives proposed by UP&L. One function of an EIS should be to propose and evaluate alternatives which seem feasible whether they are considered as such by the company or not. We must remember that it is the public's air, water, and land which go toward making this project feasible, and the public should have more than a prefunctory say in where it is located.

Your consideration of alternative sources of power generation, including energy conservation, is not even good enough to be rated inadequate. The reason why we have no laws relating to energy conservation in Utah is that we live in a fool's paradise where the magical system of "free enterprise" will provide for all our needs seemingly forever, if only the "radical environmentalists" wouldn't raise embarassing questions all of the time. Our need for this plant, and perhaps those to follow, is dependent on the demand in the UP&L service area increasing at an annual rate of 10.4%. If UP&L hopes to maintain this rate for very long they are even more foolish than I have been led to believe. The unbelievable capital expenditures required to maintain a growth at this pace will send energy costs out of sight and will bankrupt the utility in short order. At least one of the problems UP&L has, namely its spiraling requests for rate increases and its low score in public trust, can be directly attributed to our lack of any consideration of conservation as an alternative to construction. With energy demand actually decreasing in some areas of the country without any noticeable decline in standard of living, Utahns move along as if the energy crisis were a myth. The energy conservation alternative should not be dismissed because no one forces us to conserve. We know we can do it if we have to, and maybe there will have to be an actual threat of shortage before we make any moves in that direction. Your EIS should include an analysis of how much energy we could actually save in Utah by energy conservation measures. Remember that the power from Emery is not to meet current needs, only future demands, and so we are not discussing rebuilding Salt Lake City. Only future construction of offices and housing would have to meet stricter design standards, and we already know how to do space heating and cooling without using electricity

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to do the whole job. Certainly an EIS cannot force us to begin making the changes we need so desperately, but it might attempt at showing how we might be able to do without more Emery's. Continuing to plan for a 10⁺% growth rate in energy consumption is akin to building a boat with a hole in the bottom and then installing an engine so large that speed alone allows a trans-Atlantic crossing before the thing can sink. It's not only horribly wasteful, but the passengers never know how much danger they are in until a small malfunction sends the whole conglomeration to the bottom. One would hope we have enough collective sense to change the system before it is too late.

To conclude, I do not oppose the Emery project, or even this particular site. Perhaps when all is said and done we have little choice at this juncture except to allow construction to proceed as planned. I think the EIS is a fair analysis of the impacts to be expected from its construction and operation, and these impacts do not seem unacceptably severe. I do object, however, most strongly to the way we are going about this project, and I hope the lessons learned here will help us avoid similar situations the next time around.

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STATE OF UTAH–DEPARTMENT OF SOCIAL SERVICES

CALVIN L. RAMPTON
Governor

PAUL S. ROSE
Executive Director

DIVISION OF HEALTH
44 MEDICAL DRIVE
SALT LAKE CITY, UTAH 84113
AREA CODE 801
533-6108

LYMAN J. OLSEN, M.D., M.P.H.
Director of Health

Board of Health
Air Conservation Committee
Health Facilities Council
Medical Examiner Committee
Nursing Home Advisory Council
Water Pollution Committee

Environmental Health Services Branch
72 East 4th South
Salt Lake City, Utah

September 20, 1976

Mr. Paul Howard
State Director, Utah State Office
Bureau of Land Management
136 East South Temple
University Club Building
Salt Lake City, Utah 84111

Dear Mr. Howard:

The Draft Environmental Statement for the Emery Power Plant has been reviewed. The following corrections/deletions/additions are suggested:

Page	Location	Comments
1-17	2C	Bureau of Environmental Health should read: "Environmental Health Services Branch."
1-25	2nd paragraph under 5	The Utah State Division of Environmental Health should read: "The Utah State Division of Health, Environmental Health Services Branch."
1-25 and 1-26	Paragraph beginning at bottom of page	It is now (September 20, 1976)(both the Senate and the House have approved separate versions) very doubtful that Congress will approve the Clean Air Act Amendments before adjournment in early October, 1976. These amendments, which include the Prevention of Significant Deterioration provisions, are likely "dead." If so, the EPA's regulations apply and the Class II designations remain valid.
1-43	Table 1-4	The SO_x emissions (as SO_2) are shown as 90 TPD, which is the predicted uncontrolled emission. Our approval of plans for this project requires 80% SO_2 removal. On April 15, 1976, UP&L awarded an order to Chemico Air Pollution Co. for a sulfur scrubber, specified to remove 80% of the SO_2 from the emission.

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Page	Location	Comments
1-124	Table 1-7-7	An additional footnote might logically be included to note that a regulation requiring 80% removal of SO_2 was in effect at the time the Executive Secretary, Utah Air Conservation Committee, gave approval for construction of the Emery Power Plant.
1-124	Table 1-7-7	Change "Committed Emission Control by Applicant" to 80%, rather than "0," as shown. On April 15, 1976 UP&L awarded an order for a sulfur scrubber for the Emery No. 1 Plant to Chemico Air Pollution Company, specifying an 80% removal efficiency for SO_2.
2-23	First paragraph	It may be in error to estimate that concentrations of photochemical oxidants (measured as ozone) will be low. Monitoring performed on other relatively undeveloped and sparsely populated areas of Utah indicates that background ozone concentrations have exceeded the National Ambient Standards.
5-4	Paragraph under "(b) Nitrogen Oxide"	Following the words "boiler temperatures," add the words "and firing methods."
6-4	Paragraph under "C. Air Quality"	Receptacle is an inappropriate word in its usual sense.
7-3	Paragraph under "B. Air Quality"	At end of second line following the word "project," add the words "unless improved technology is later retrofitted."
8-8	Third paragraph	Since UP&L is now committed to purchase a sulfur scrubber for the Emery No. 1 Plant, the alternative is now a reality and should be reported elsewhere when the Final Environmental Statement is prepared. There is some inconsistency with fact in the past actions. The correct information is provided and should follow the sentence: "The approved design included a commitment to remove 80% of the SO_2." The Utah regulation requiring 80% removal of SO_2 was later rescinded and after due consideration, the Utah Air Conservation Committee determined that the State would not now require the use of flue gas desulfurization units

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Page	Location	Comments
		for the Numbers 1 and 2 units at the UP&L Huntington and Emery Plants. However, although the authority to modify the plan approval (as approved December 12, 1973) has been given to the Executive Secretary, Utah Air Conservation Committee, the Utah Power and Light Company has not submitted the necessary request, plans, and specifications; consequently, the proposal as previously approved is still in effect.
8-8	Last paragraph	The 80% control of sulfur emissions is not a Prevention of Significant Deterioration Regulations requirement, rather, it was a requirement imposed by a State regulation which was in effect until July 10, 1975. The State's approval of the proposed construction was given December 12, 1973. Because the PSDR was not promulgated until December 5, 1974, the Emery Plant as approved by the State was considered to be an existing facility under PSDR; however, if the plan approval were modified, the facility would be regarded by the Environmental Protection Agency as a modified source (modified after the effective date of the PSDR) and would be subject to PSDR.

Sincerely,

Alvin E. Rickers

Alvin E. Rickers
Director
Bureau of Air Quality

AER:csc

cc: Chauncey Powis, State Planning Coordinator's Office
David G. Blake, Utah Department of Transportation

25

PEABODY COAL COMPANY

301 NORTH MEMORIAL DRIVE · ST. LOUIS, MISSOURI 63102

September 22, 1976

United States Department
of Interior
Bureau of Land Management
Richfield District Office
Environmental Project Staff
146 North Main
P.O. Box 767
Richfield, Utah 84701

Attention: Mr. Carl J. Thurgood,
Acting Project Manager

Re: Emery Power Plant Environmental Statement

Dear Mr. Thurgood:

Please find enclosed Peabody Coal Company's comments on the Emery Power Plant Environmental Statement. Our response to questions raised at the Castle Dale and Provo hearings on the statement are included. The enclosures are:

1) Written Comments on the Environmental Statement

2) Map (corrected Figure2-6) showing coal areas for Wilberg and Deer Creek Mines

3) Drawings showing the layout of surface facilities

4) Statement by Mr. John Peperakis on subsidence

If there are any questions on these comments please contact me.

Very truly yours,

Jack L. Beckner

Jack L. Beckner
Environmental Manager
Impact Reports

JLB/md

cc: Mr. Frank Davis, Utah Power & Light w/o enclosure #3
Mr. John Peperakis, w/o enclosures

25

Draft Environmental Statement

EMERY POWER PLANT

(WILBERG MINE)

COMMENTS, PEABODY COAL COMPANY

Peabody Coal Company is a wholly-owned subsidiary of Kennecott Copper Corporation. The Company's home office is at 301 North Memorial Drive, St. Louis, Missouri 63102. Peabody proposed to operate Wilberg Mine to provide coal for Utah Power & Light Company's Emery County Generating Station. The mine will be operated as an underground mine with a portal in Section 27 of Township 17 South and Range 7 East in Utah.

Coal to be mined is federally owned coal with appropriate royalties to be paid to the U. S. Government. The coal is contained within lease U-064900. In June, 1973, Peabody submitted a plan to the U. S. Geological Survey for the reopening of the Wilberg Mine. As the mine site was located on U. S. Forest Service controlled surface, they were advised of the plan. An Environmental Analysis was completed in September 1973, and since, at that time, the Mine was to be opened for prospecting, it was determined that no Environmental Statement would be required. After agreeing to certain stipulations set forth by the U. S. Forest Service, Peabody was given permission to reopen the Mine. A more detailed exploration plan was submitted to the Survey on December 12, 1973. Approval of the plan was by letter from Mr. Jackson W. Moffitt, Area Mining Supervisor, dated February 12, 1974. Peabody is now developing Wilberg under an approved exploration plan granted by the U. S. Geological Survey, along with qualified approval of the current surface

operating plan by the Forest Supervisor of the Manti-LaSal National Forest. This coal lease contains two principal seams: The Blind Canyon seam lying from 800 to 2,400 feet below the top of East Mountain in Township 17 South, Range 7 East in Utah. The Hiawatha seam lies from 80 to 130 feet below the Blind Canyon seam. Over 80 per cent of this seam has more than 1,500 feet of cover. The outcrop of the Hiawatha seam is visible some 200 feet above the confluence of the East and West Forks of Grimes Wash. Both seams vary, but average approximately 12 feet in thickness.

To operate the mine, surface facilities at the portal area will include employee parking, a repair shop, a mine-storage yard and coal handling facilities. These surface facilities will occupy approximately 17 acres. Near the portal of the mine, but installed underground next to the portal, a bath house, office and warehouse will be provided. Surface area required for the coal conveyor belt, breaker, stockpile and load-out facility will require an additional 73 acres.

Water for operation of the mine including culinary water requirements and dust suppression water requirements will come from the mine itself. Water in excess of that required for mine operation will be carried by pipeline from Wilberg to the entrance of the abandoned Anderson Mine in Section 26 of this Township. Anderson Mine and Utah Power & Light's Church Mine are interconnected. From Anderson Mine, Utah Power & Light will pipe this water to their currently active Church Mine for use there.

Wilberg Mine is described in the Emery Power Plant Environmental Statement prepared by the Bureau of Land Management,

U. S. Department of Interior. The following comments pertain to specific portions of this Environmental Statement as it relates to Wilberg.

Page 1-9, Table 1-1, SUMMARY OF QUANTITIES

Land for the Coal Source will utilize about 90 acres on the surface. The 84 million tons of coal required for the power plant will be provided from both the Hiawatha and the Blind Canyon seams. Water for culinary purposes will be about 14,000 gallons per day. These figures are somewhat larger than those shown in this Table.

Additional details on water requirements and the impact of its use will be discussed below.

Page 1-11, Chapter 1, Part B, GOVERNMENT AUTHORIZING ACTIONS REQUIRED

1. Federal Actions Required to Authorize the Proposed Project

We recommend that a separate listing be presented for authorizing actions required by the mine and by the power plant. Our understanding of Federal actions required to authorize operation of the mine is as follows.

a. Bureau of Land Management

(1.) Grant a 100 foot tramway right-of-way for the coal conveyor from the Mine across 0.45 miles of National Resource lands.

(2.) Grant a Special Land Use Permit for approximately 54 acres of National Resource lands for a permanent coal storage pile with reclaim and loadout facility.

(3.) Offer for competitive lease sales an area nominated by Peabody July 31, 1976, comprising 4,840 acres

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in the vicinity of Wilberg and Deer Creek Mines.

(4.) Grant a 100 foot right-of-way for a sewer line over 725 feet of National Resource lands.

(5.) Grant a Special Land Use Permit for 2.3 acres for a leach field for waste water disposal on National Resource lands.

b. Page 1-14, U. S. Geological Survey

(1.) Approve the mining plan and administer operation of the coal leases at Wilberg Mine.

(2.) In consultation with the U. S. Forest Service, approve the surface facilities plan within the boundaries of the coal lease.

c. Page 1-14, U. S. Forest Service

(1.) In consultation with the U. S. Geological Survey as mentioned above, approve the surface facilities plan within the boundary of the coal lease.

(2.) Grant a 100 foot Special Land Use Permit for a coal conveyor for Wilberg Mine across approximately 0.9 miles of Manti-LaSal National Forest. This permit would include dirt road maintenance.

(3.) Grant a Special Land Use Permit for the sewer line as described in greater detail below.

(4.) Grant approval of installation of a pipeline to conduct excess mine water from Wilberg to the Anderson Mine. We understand that the Forest Service has granted approval for a temporary line for this purpose already. Approval for permanent installation is under consideration.

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(5.) In addition to the above actions, the U. S. Forest Service has been requested to grant temporary use of Forest Service land for a temporary stockpile, transfer, temporary reclaim and stockpile belts, and a temporary truck loading facility. These facilities are described in greater detail below.

d. U. S. Environmental Protection Agency

Discharge of water to Grimes Wash is not planned on a routine basis. However, because of the unknowns involved in this mining situation, it is necessary to plan for this eventuality. Therefore, an application for a National Pollutant Discharge Elimination System permit has been filed with the EPA on November 12, 1975, who will forward it to the State of Utah for its approval.

2. Page 1-16, <u>State Actions Required to Authorize the Proposed Project</u>

c. State of Utah - Department of Social Services, Division of Health

(1.) Issue permits for the culinary water source treatment, plumbing facilities within the mine, and disposal of waste culinary water, agree to the issue of an NPDES permit by the USEPA. On August 19, 1976, the Utah Division of Health approved Peabody's plans for construction of a sedimentation tank at Wilberg and issued a construction permit for same.
A notice of intent to construct, by Peabody, was submitted to the Utah Air Conservation

Page 1-55, Chapter 1, Part D, APPLICANTS PROPOSAL

5. Coal Source

b. Wilberg Mine

Page 1-55 predicts a coal usage over the 35 year life of two units to be a maximum of 84 million tons. Utah Power & Light Company believes that the likely maximum usage, considering lower load factors in the later years of the plant, will be approximately 60 to 70 millions tons for two 400 megawatt units.

The 70 million tons of reserves referred to on page 1-58 should be corrected as follows. From the area of lease U-064900, together with the area identified as "option areas" shown in Figure 2-6, as corrected on the attached plate, Peabody has dedicated to Utah Power and Light Company, 150 million tons of recoverable coal which will be utilized for both the Huntington and Emery Plants. Coal from any portion of these areas may be utilized for either plant. In addition, Peabody has granted Utah Power & Light a right of first refusal in an option on recoverable coal in excess of 150 million tons.

Initial operation at Wilberg will be by room and pillar mining. After an area has been mined to the fullest extent possible utilizing room and pillar mining, pillars will be removed as the mining operation retreats toward the portal. Even in this case, barriers will be left to control subsidence. Between the development of passageways and crosscuts, the selective mining of pillars or portions of them, 70% of the coal within a

panel (or section) may be extracted. The remaining 30% represents the pillars of coal left in place to control subsidence. Considering a large area of the mine, including several panels with main and submain passageways the total extraction of coal is expected to be about 50%. The reduction in recovery results from the necessity of leaving pillars in the mains, submains and panel passageways.

In future operations at Wilberg, long wall mining may be utilized, as described in Chapter 8 of the Statement, so that the per cent of the coal recovered may be increased somewhat above 50%. Further, future plans indicate that both the Blind Canyon seam and the Hiawatha seam may be mined from both the Wilberg and the adjacent Deer Creek Mines. This will maximize the amount of coal that can be recovered from both seams.

Coal from the Blind Canyon seam to be delivered to the Emery Power Plant would be collected in a vertical bin within the mine to be discharged to the conveyor belt leading to the portal for Wilberg.

To operate the Mine, approximately 14,000 gallons per day of culinary water will be required. This water will be used for sanitary purposes, drinking water and showers. Water from within the mine will be stored in a 60,000 gallon tank located in the old works. This storage tank will provide a final settling stage for clarifying the fresh water. The tank will be fitted with a clean out sump for removal of settled solids.

From the storage tank water will pass through a pressurized filter, a softener, and chlorinator before going to the cold water storage and hot water heater tanks.

Waste culinary water will be carried by pipeline to a septic tank. From there it will go to a leach field (mentioned above) where it will return to the groundwater aquifer. Very little consumptive use of water will actually occur in this system.

Operation of the mine will require approximately 51,000 gallons per day of water to be used principally for dust suppression. The source of this water will also be within the mine itself. Since this water will not leave the mine proper, its use is not considered a comsumptive use.

(3.) Mine Mouth Facilities

ACCESS ROAD

Access to the mine will be by an existing road connecting with highway U-29 inthe southwest quarter of Section 13, Township 18 South Range 7 East. The road crosses National Resource Lands and U. S. Forest Service property and is currently maintained by Emery County. It will be surfaced to handle traffic normally travelling at 30 miles per hour.

Where the alignment of this road coincides, with water and/or sewer pipelines, near the mine-storage yard, these lines will be buried in a ditch paralleling the road designed according to U.S. Forest Service specifications.

Maintenance of the road is scheduled by the County, but Peabody will surface the road.

MINE-STORAGE YARD

The location of the mine-storage yard and related surface facilities are shown in Drawing 256-10-G1, attached. The storage yard will be at the junction of the East and West forks of Grimes Wash (about five miles from highway U-29). It will include approximately 110,000 square feet and will be gravel surface. The gravel surface will absorb precipitation and nearby runoff.

Prior to construction of the mine-storage yard area, a culvert will be laid to the East fork of Grimes Wash connecting with an existing culvert in the West fork and extending southward with the lower end open to Grimes Wash. These culverts will be 78 inches in diameter and will handle a maximum anticipated rainfall. Their installation will aid in preventing coal dust from the portal area from entering runoff flowing down Grimes Wash

MATERIAL TRAMWAY

A tramway will be installed with branches leaving the mine storage yard leading to a single tramway line which will climb the existing access up the West fork of Grimes Wash, make a hairpin turn, and continue up the side of the mountain to the portal. This tramway will move material up the remaining 200 feet of elevation to the portal above the storage area. The tramway-hoist power house will be situated in the West fork of Grimes Wash near the western extremity of the portal area. The existing road from the mine storage yard area to the portal will be widened to allow vehicular access parallel to the material tramway route.

EMPLOYEE PARKING LOT

Employee access to the mine will be from highway U-29 along the access road with a passenger car branch which will follow the eastern border of the East fork of Grimes Wash to the employee parking lot.

The culvert, mentioned above, will extend slightly up the valley above the parking lot and run under the lot. The parking lot will handle 200 cars. It will be hard surfaced and have a slope of approximately 10 per cent.

MAN LIFT

From the employee parking lot, a man lift will be constructed on the West face of the valley of the East fork of Grimes Wash to the level of the mine portal. From the upper end of the man lift, employees will walk approximately 100 feet to the mine portal.

ANCILLARY SURFACE EQUIPMENT (MINE-STORAGE YARD LEVEL)

At the level of the mine-storage yard a repair shop along with a fuel dock, and rock dust storage facility will be constructed. The repair shop will be a building providing approximately 6,750 square feet of automotive-repair type of space.

PIPELINES

Bath house facilities for the mine are underground adjacent to the portal. The sewer line from the bath house will run down the mountain to a 12,566 gallon septic tank as shown in Drawing #256-10-G2. Effluent from toilets, showers and drinking fountains will be collected in the septic tank. From the septic tank, the sewer line will follow the route of the access road to a point shown on Drawing #256-10-G4 where the line will diverge to the West to enter the leach field shown on the same drawing. (See the discussion below for a description of the leach field.) The sewer line will be six inches in diameter, and manholes for cleanout access will be installed at regular intervals as shown on drawings attached.

A six inch diameter plastic pipe will be installed to

conduct excess mine water from Wilberg to the entrance of the abandoned Anderson Mine. Installation of this line on a temporary basis has been approved by the Forest Service. Approval of the permanent installation is now being requested from the U. S. Geological Survey and the U. S. Forest Service. The permanent and temporary routes are identical. The temporary line will be essentially laid above ground, and follow the same route as the sewer line (paralleling the access road) until the line diverges from the access road eastward to a pumping station. From the pumping station, the line will be buried to the entrance of the Anderson Mine. The line will follow the route as shown on Drawing #256-10-G4A to the base of the old tramway leading to the entrance of Anderson Mine.

LEACH FIELD

The location of the leach field is shown on Drawing #256-10-G4. The leach field is proposed to be installed on National Resource lands and an application for a Special Land Use Permit for this purpose is in preparation. The field will occupy a space approximately 200 feet by 225 feet.

The construction of the leach field will consist of a drainfield with a bottom area of 13,050 square feet and 6,500 feet of six inch PVC sewer line. The field site exhibits a percolation rate of approximately 20 minutes per inch. Lines in the drainfield will be connected in a parallel fashion.

COAL HANDLING SYSTEM

The coal handling system at the mine will consist of a conveyor belt exiting the portal and discharging to the top of a concrete silo as shown on Drawing #256-10-G2. There is a discharge at the bottom of the silo to an elevated conveyor

belt that will carry the coal along the right-of-way, depicted on the same drawing, to a rotary breaker also shown on this drawing. Construction of an elevated conveyor will minimize surface disturbance. From the discharge of the rotary breaker, a conveyor will carry the coal 6,300 feet to a 25,000 ton live stockpile. The breaker will be fitted with dust control water sprays. The stockpile will be conically shaped and covered to divert precipitation. Drainage ditches will divert upslope runoff around the stockpile to avoid any contamination of natural runoff by coal dust. Any water which is contained in the coal will drain to the bottom of the stockpile and be collected in an inner ditch where it will evaporate. Reclaim from the live stockpile will be by rotary plow to load a conveyor which will carry the coal to a batch weighing and sampling system. Coal haul trucks will pass under the weighing and sampling house in a circular traffic pattern as shown on Drawing #256-10-G6.

The conveyor will be an elevated and covered structure. The cover over the conveyor is designed to avoid losses due to blowing coal dust and thereby control air pollution. Since the conveyor will be elevated, no access route will be required parallel to it. Construction of support towers will be timed to surfacing the access road to minimize environmental disturbance. The conveyor belt will be 48 inches wide and will carry 1,200 tons per hour.

Until approval of a Special Land Use Permit from the Bureau of Land Management for the area required by the permanent stock pile and load out facilities, temporary facilities will be constructed as shown in Drawing #256-10-G3. From the transfer

point shown on Drawing #256-10-G3, a temporary conveyor belt will carry the coal from the permanent conveyor belt right-of-way to a temporary stockpile. This stockpile is designed as a 12,000 ton stockpile. The stockpile will be conical in shape and will be protected from upslope runoff. Coal will be reclaimed from the temporary stockpile utilizing an end loader. The area will be hosed with water to control dust as necessary. The end loader will load a small hopper and feeder which will discharge onto a temporary reclaim conveyor which will carry the coal to a temporary truck hopper also located on Drawing #256-10-G3. From this temporary truck hopper, coal haul trucks will be loaded and leave on a circular traffic pattern to carry coal to the power plant.

After installation of the permanent coal handling facilities are completed, the temporary facilities will be removed. All structures related to them will be dismantled. The area will be cleared of trash and reseeded with a mixture of seeds and bushes appropriate to the area. Revegetation will be accomplished utilizing currently accepted, good agricultural practices.

Temporary coal handling facilities now exist for development purposes in the vicinity of the mine-storage yard. Presently, a temporary conveyor carries coal from development areas in the mine to a temporary crusher located on Drawing #256-10-G1. The discharge of this crusher is to a temporary chute which conveys the coal to a temporary truck bin at the foot of the slope below the portal. This temporary truck bin is also located on Drawing #256-10-G1. Coal haul trucks are loaded as necessary to remove development production of coal. When trucks are not being loaded, coal is stored on the ground near the foot of the

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truck bin. This temporarily stored coal is reclaimed utilizing a front end loader.

SUBSTATION

Permanent power to the mine will be supplied by a substation located at the portal level just East of the portal. The substation is designed to handle 69 kilovolts. The power line will follow the existing route to the portal area.

VENTILATION EQUIPMENT

The ventilation plan for the mine requires installation of a fan on the surface. The fan is located in the southwest quarter of the southeast quarter of Section 22, Township 17 South, Range 7 East.

Page 3-30, Chapter 3, Part D, GEOLOGY AND TOPOGRAPHY

1. Mine Site

The Emery Environmental Statement addresses subsidence and the results of subsidence, should it occur, in the following places:

Page 2-29, Chapter 2, Part B
Page 3-30, Chapter 3, Part D
Page 3-44, Part G, Section 2
Page 3-68, Part L. Section 2.a
Page 3-68, Section 2.b
Page 3-90, Part N, Section 2
Page 4-11, Chapter 4, Part E, Section 2
Page 4-12, Section 3

In addition to the discussions of subsidence listed above, the Statement also mentions it in the summary-type Chapters 5, 6 and 7. In view of the circumstances of mining at Wilberg,

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it does not appear that subsidence will actually manifest significant surface effects. When an underground opening is established, the original equilibrium is disturbed with resultant stress concentrations. While many factors are involved in opening stability, the span, or width of opening, is undoubtedly one of the most important factors in failure. Assuming it is relatively small, the overlying rock strata can bridge across the opening and little, if any, movement or convergence of top and bottom will occur. However, as the span increses, a point is reached where the stress in the overlying rock strata exceeds the strength value of the rock, and the top breaks. If the opening span is limited to a subcritical value and/or is at great depth, as at Wilberg Mine, a pseudo-arch will form, achieving stability before rupture occurs at the surface.

The boundary of this arch is thought to approximate an ellipse in form with the long axis vertical and equal to four times the width of the opening.

In Great Britain, the National Coal Board had measurements made over 157 coal mines from 100 to 2,600 feet deep, with seams ranging in thickness from 2 to 18 feet and inclines up to 25°. Opening widths varied from 100 to 1,500 feet and width/depth ratios from 0.05 to 4.0. It was apparent that as long as the width/depth ratio is less than 0.25, subsidence (and inferentially surface damage) is negligible.

Page 3-49, Chapter 3, Part H, WILDLIFE

4. Terrestrial Wildlife

Peabody experience indicates that deer are not adversely

impacted by the noise and activity of coal mining. Such animals have been observed to approach and cross active mining areas. Evidence of deer on freshly graded areas and highwall sides of surface mines indicate approaches to within a few hundred feet of active mining areas. At Wilberg, the portal area is on steep terrain not readily traversed by deer. The steepness of the canyon walls will provide a natural barrier to propogation of noise and thereby also reduce the effect of mine operation on wildlife. The conveyor belt is designed as an above-the-ground-structure, supported by towers. Thus, deer, elk and other wildlife will experience no difficulty in crossing the conveyor belt right-of-way, and the affect on deer from the conveyor belt will be minimized.

Page 3-78, Chapter 3, Part M, <u>HUMAN RESOURCES</u>

2. <u>Employment and Income</u>

According to the 1974 United Mine Worker's Association Contract, the average income for mine employees is $14,209.00 per year. The projected income appearing on page 3-78 in Table 3-15 of $12,500.00 is too low.

Chapter 4, <u>MITIGATING MEASURES</u>, Part B, <u>MEASURES REQUIRED BY FEDERAL AGENCIES</u>

1. ".... No dozer, blade, or ripper-equipped track vehicles would be allowed..."

Peabody proposes to use track dozers or ripper-equipped vehicles for use in construction of the pipelines and coal conveyor belt.

2. Page 4-4, "Prohibit vehicle travel during the spring thaw and runoff...."

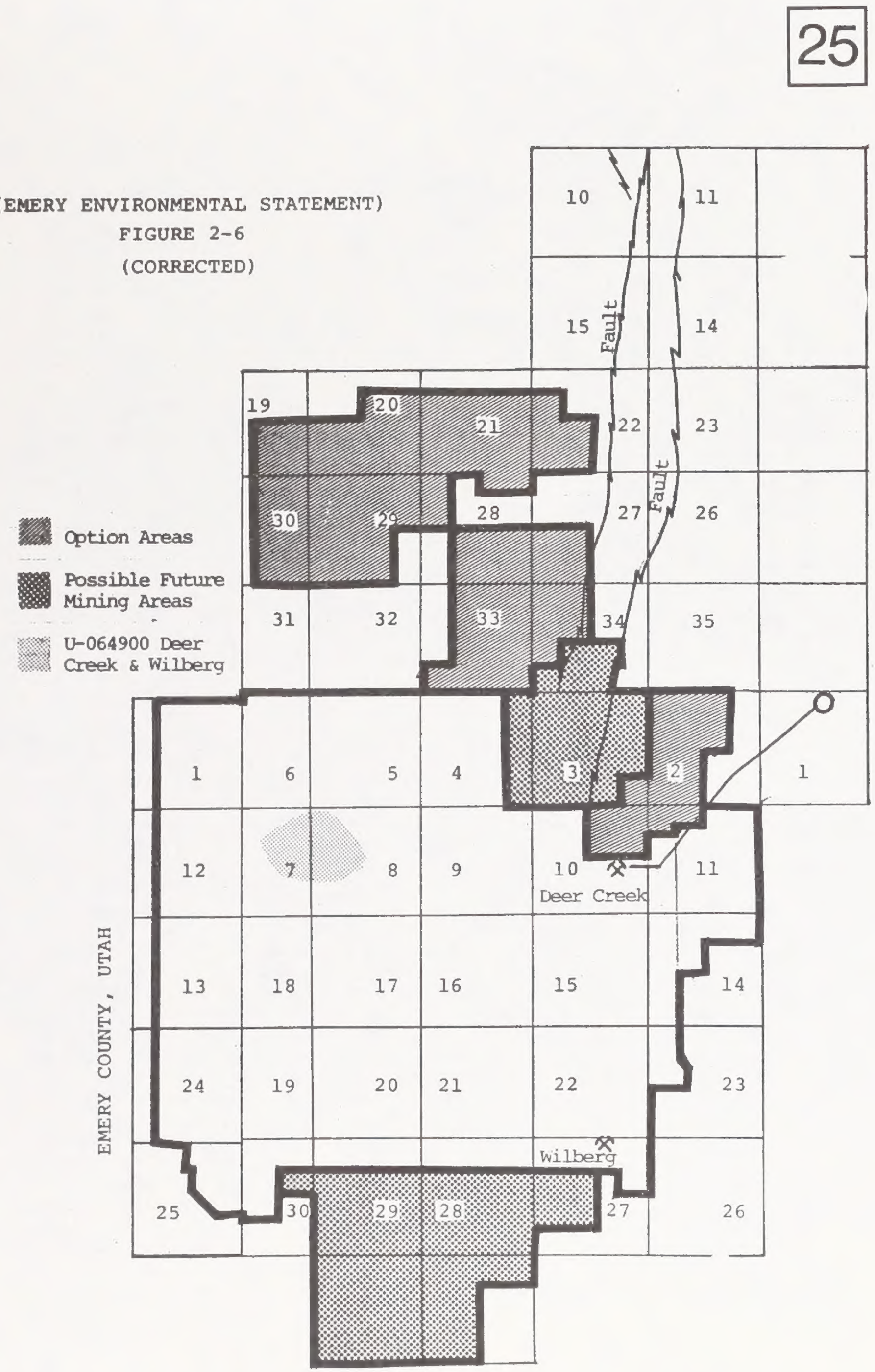
We need some clarification of this mitigating measure. Access to the mine and all parts of the complex is necessary during all kinds of weather. Continuous access is necessary to realize maximum efficiency of mine production.

9. <u>Minerals</u>

The use of 84 million tons of coal over the lifespan of Emery Station is a utilization of the coal as opposed to a loss of the coal. The potential loss of coal remaining in the ground which is not mineable by economical methods may further be reduced by development of mining methods and improved techniques within the lifespan of Emery Station. The Statement indicates that 147 million tons of coal will be lost if the project is authorized. The amount of coal actually lost should be reported only as coal left in place in the mine after mining 84 million tons. The amount left in place will depend upon the per cent recovery achieved over the life of the mine.

Peabody sincerely appreciates the opportunity to present these comments on the Emery Draft Environmental Statement. Further, the Company hopes that the Task Force will give them due consideration, and where appropriate, see fit to modify conclusions presented in the Draft Environmental Statement.

(EMERY ENVIRONMENTAL STATEMENT)
FIGURE 2-6
(CORRECTED)



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JOHN PEPERAKIS
CONSULTING ENGINEER, COAL MINING

REGISTERED
UTAH, COLORADO AND WYOMING

4968 NANILOA DRIVE
SALT LAKE CITY, UTAH 84117

September 3, 1976

Mr. Jack L. Beckner
Environmental Manager
Impact Reports
Peabody Coal Company
301 North Memorial Drive
St. Louis, Missouri 63102

Dear Jack:

Herewith are my comments concerning topographic effects of underground mining under deep cover.

As far as mining of coal is concerned, Utah is a deep mining state. Mine operations are carried on under cover that on the average is the deepest in the United States. Todate several hundred million tons of coal have been mined under deep cover in Carbon and Emery counties.

One of the characteristics of Utah coal formations is the extensive burning along the outcrops of the coal seams where former natural caused fires have burned deep into the coal beds and extend in some cases several thousand feet back from the outcrops. The evidence of outcrop burning is also visible along the outcrops in the vicinity of the Wilberg Mine.

In the Utah coal fields in the area of former mining and present day mining, subsidence has occurred from two causes. In one subsidence has been caused by mining activity and in the other subsidence has been caused by natural fires which have burned out the coal seams and have resulted in the settling of the strata above. Some of these natural fires are still active. In recent years the BLM has done a good job of sealing and extinguishing most of these fires. Under deep cover it is difficult to observe the effects of subsidence. Some very modest cracks do appear on the surface under modest cover. It is even difficult to to observe the effects of natural burning except in very shallow cover areas. Most of the evidence is the creation of the typical pinkish coloration of the cliffs along the outcrops. This coloration provides the distinct scenic effect of the cliffs in the Wasatch, Book Cliffs and other coal fields of the state.

In deeper areas and some not so deep where the coal seams are still in place and have not been mined, but are surrounded by zones burned out by natural fires, one cannot differentiate any effects on the overlying topography. In other words the line of demarkation between the burned out and subsided area and the virgin coal area cannot be determined. It is usually determined by drilling or by underground development which intersects the subsided area. Subsidence caused by natural fires is best observed in the Kaiparowits Plateau under very shallow cover over the coal beds. Here wide cracks resulted from the settling of the overburden.

It can be said that the effects of subsidence have been far more marked where natural burning out of the coal beds has occurred than over areas of deep cover where mining activity has been carried on.

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In a few areas where the coal seam has not been burned at the outcrops and mining extraction has been carried on practically to the outcrop has led to minor slides of cliff material down the mountain side. This can be seen at some points in the Sunnyside area. This type of disturbance can easily be avoided by leaving protective pillars to preserve the integrity of the cliff line above. In the case of East Mountain there is very little possibility of this taking place because the Wilberg mine area is bounded by very little outcrop exposure. That part that is exposed is largely burned zone forming a natural barrier to mining close to the cliff line.

The subsidence question has been blown all out of proportion in impact statements which curiously all sound alike. Let us look at the effects of subsidence in the deep mining districts beyond our own borders. The Ruhr coal basin is one of the great coal producing districts in the world. All coal mining there is deep and the geologic structure more complex as compared to Utah and other U. S. coal fields. Numerous coal beds have been mined and continue to be mined. Mining has gone on for many generations. Billions of tons of coal have been mined. Thick seams and thin seams have been extracted. The range of subsidence in this compact mining area is far greater than anything that can possibly occur over the Wilberg Mine under East Mountain. Longwall has been the predominant system of mining. Densly populated cities and suburbs exist over the mines. To list a few cities- Essen, Duisburg, Oberhausen, Krefeld, Bottrop, Wanne-Eickel, Gelsenkirchen, Bochum, Dortmund, Recklinghausen and so on. Extensive networks of freeways crisscross the area. Also extensive networks of barge canals, numerous and vast industrial complexes. To top it off the Ruhr area is quite attractive. These people have learned to live with subsidence and do not have the tendency to get emotional about.

Mining is also carried on under many population centersin France, Belgium and the United Kingdom.

Much is made of the disruption of water tables, stream lines and lakes. Mines in Nova Scotia, The United Kingdom and Japan extend under the sea for several miles. Longwall extraction is generally practised. If subsidence fractured the overlying formation as is implied in impact reports on the subject these mines should be flooded, but they are not.

It has not been an uncommon practice in the coal industry to mine an overlying seam after an underlying seam has been mined. If the interval of rock is substantial between the seams subsidence has not effected the seam above to the point where difficult conditions of mining exist. This is a good indication that strata above is not greatly disturbed.

In the East Mountain area where the Wilberg Mine will be projected, only two beds will be mined. The cover in this locality will average around 1750 feet and under the summit of the mountain will exceed 2000 feet. Assuming that at most a total of 15 feet is extracted under an average cover of 1750 feet. The thickness extracted would average 0.0085 of the total strata column. Using the York Canyon, New Mexico monitoring of subsidence results which under 500 feet showed 40% of seam thickness mined. This comes out at 0.0034 of the total column. Furthermore the East Mountain formations contain a lot of thick sandstone beds which will further reduce the extent of subsidence. The much heavier cover will also play a part in minimizing the settling. Really this is insignificant. The effects would be indescernable.

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The terrain above the Wilberg Mine is mountainous with deep steep walled canyons. There is very little flat area. In the impact, statement it is stated that a depression ranging in depth from less than one foot to several feet at the center would most likely form over an area that would be mined. It is hard to conceive the formation of a depression on a steep mountain side. Or the alteration of stream lines. Mining under this deep cover will probably be by longwall methods, as it is the only option available for high coal recovery. Longwall will allow the surface to settle throughout except in the strips formed by chain pillars and barrier pillars. The settling will be minimal and may require instrumentation to determine.

I can foresee no hazard to human safety if the rim rock overlooking surface facilities is protected. The fact that a lot of the Wilberg Mine facilities are located underground is a plus factor. There is far more hazard to people walking around mountain sides especially in the fall and spring months when alternate thawing and freezing occurs. Large amounts of rock roll down the cliffs. It is hoped that mining will not be saddled with this blame also. There is more hazard to humans when driving through canyon areas on our highways. Many highway cuts are deep and insecure. Generally mine roads are now secured by railing and hazardous cuts are secured in accordance with MESA regulations. Subsidence will not form any offsets on the surface. Surface cracks will seal. At Sunnyside under Whitmore Canyon and Creek coal was extracted 600 feet below. Some minor sttling took place and a few cracks appeared. The seam thickness extracted here was about 12 feet. The following year all indications of this subsidence disappeared. Even larger cracks fill in a few years and all signs are gone.

John Peperakis

JOHN PEPERAKIS
CONSULTING ENGINEER, COAL MINING

REGISTERED
UTAH, COLORADO AND WYOMING

4968 NANILOA DRIVE
SALT LAKE CITY, UTAH 84117

September 3, 1976

Statement concerning topographic effects of underground mining under deep cover at the Wilberg Mine, Emery County, Utah.

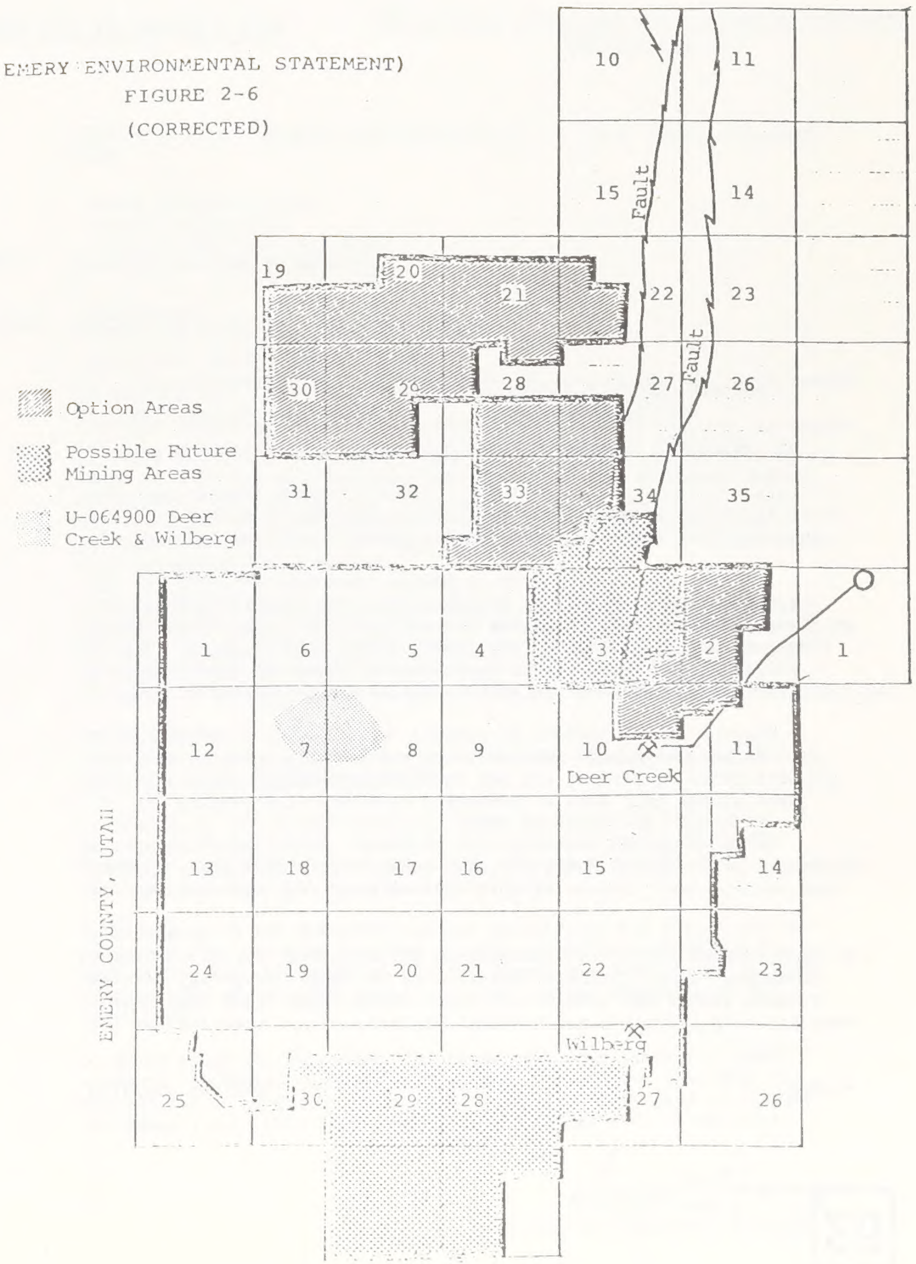
The Wilberg Mine area will be in the southern portion of the East Mountain roughly between Grimes Wash in the east and Cottonwood Creek in the west. North of it is the area assigned to the Deer Creek Mine. To the south it is bounded by BLM lands covering the extreme south point area of East Mountain. The cover over the coal seams is generally very deep. Only in the Grimes Wash Drainage and in the Cottonwood Creek drainage can the cover be considered as modest. Within the interior area of East Mountain overlying the projected workings under the "Cap" the cover exceeds 2000 feet. The rock formation overlying the coal seams consists of thick sandstone beds, typical of Utah coal field formations. In most of the Wilberg Mine area two seams will be mined at any given locality. The first is the Hiawatha. Seventy to 125 feet above is the Blind Canyon or the Bear Canyon. Because of the deep cover which precludes room and pillar mining, operations will be carried on using the longwall method. This method of mining generally obtains a higher percentage of coal extraction with a caving impact on overlying strata that is less damaging to the strata.

Subsidence will occur but it will be hardly descernible. In fact instrumentation may be the only way to determine how much settling will occur. This particularly so under deep cover. More is known about subsidence under the shallow cover prevalent in flat lying lands than is known in the mountainous terrain of Utah. We can really only base our knowledge on past experience. For decades mining has been carried on in the Book Cliffs and Wasatch Plateau. There is extremely small evidence of any adverse impact considering the magnitude of the area involving thousands of acres of mined out tracts. Having spent close to 40 years in deep mining projects and most of this time spent in mining camps and in mountainous localities I have not been able to discern any adverse impact on wild life, cattle and sheep grazing, vegetation, human safety, erosion or land use. In the past when coal was mined by hand labor the coal mining operations of Utah supported a larger population than they do now.

There are many abandoned coal mines in the Rocky Mountain area, far greater in number than the active mines of today, can anyone quantify any adverse impact to the environment from these former operations?

John Peperakis

(EMERY ENVIRONMENTAL STATEMENT)
FIGURE 2-6
(CORRECTED)



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UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

4012 Federal Building, Salt Lake City, Utah 84138

September 20, 1976

District Manager
Richfield District
Bureau of Land Management
850 North Main Street
Richfield, UT 84701

Dear Sir:

We have reviewed the draft environmental statement for Utah Power and Light Company's proposed Emery Power Plant Transmission Lines and Coal Mine. My representatives have attended the formal public hearings at Emery County High School Auditorium in Castle Dale on September 8, and the Provo City Commission Chambers, 359 West Center, Provo on September 9. We offer the following comments for your consideration in preparing the final environmental impact statement.

1. The discussion on soils is generally adequate, except that the suitability and limitations of the soils for the installation of the generating facility roads and the coal conveyor are not discussed as they would affect the structural stability of the measures to be installed.

2. There is very little discussion of the effects of disruption of the natural drainage pattern by construction of the works of improvement to be installed so that adjacent lands are not flooded or otherwise restricted in use.

3. There is adequate discussion regarding the cropland areas that will be eliminated and of the effects of reduced agricultural production, but there is no indication of how many acres of prime agricultural land will be lost either through actual construction on those lands or by depriving them of water. Also the EIS should make clear that existing conservation systems are to be protected and kept functional. There should be some discussion of the effects of the transmission lines and haul roads crossing irrigated land. These features could cause a severe handicap to improving the irrigation systems such as the installation of sprinkler irrigation lines. Wherever possible, alternate routes should be considered that would protect at least the prime agricultural lands.

4. The low annual precipitation and poor soils on the low elevation rangeland areas makes successful reseeding of disturbed areas almost impossible. On these areas, a better method of re-establishing vegetation would be to stockpile the topsoil with the native plants included and spreading this topsoil on the disturbed areas. This method will probably result in much faster rehabilitation than if subsoil is left exposed and attempts are made to revegetate these raw sites.

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5. The document states that deer numbers are currently down and then states that surrounding areas could not support additional numbers because the winter range is at carrying capacity. There does not appear to be any documentation or reference to actual productivity of the area.

6. The pipeline described on page 1-75 is cement-lined, coated and wrapped steel pipe. The actual pipeline being installed is fiberglass rather than steel.

7. The Rochester Pictographs described in page 2-62 should read "Rochester-Muddy Creek Petroglyphs and are located 2½ miles east of the town of Emery", instead of 5 miles east of the generating site as described.

8. Page 2-69 indicates sand and gravel are abundant in the area of the generating facility, while page 1-90 indicates that sand and gravel will be obtained from commercial sources near Camp Williams. It should be made clearer where the source of sand and gravel will be for the generating plant itself and if the source is different for the transmission line that should be stated also.

9. There is no mention made of noise pollution from trucks or the conveyor system during plant operation, or from exhaust smoke, noise and dust during construction.

10. The term erosive is used throughout the report regarding the susceptibility of soils to erosion. A better term would be erodable.

11. The information in the draft relating to schools, doctors, sewage treatment, etc. is out of date.

Sincerely,

George D. McMillan
State Conservationist

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DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20201

SEP 20 1976

Bureau of Land Management
850 North Main Street
Richfield, Utah 84701

Dear Gentlemen:

Enclosed are this Department's comments on the draft environmental impact statement concerning the proposed Emery Power Project located near Castle Dale, Utah.

Thank you for the opportunity to review the document.

Sincerely,

Charles Custard
Director
Office of Environmental Affairs

Enclosure

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MEMORANDUM

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service

TO : Director, Office of Environmental Affairs, DHEW

DATE: August 18, 1976

FROM : Chief Environmental Officer, H

SUBJECT: Comment on DEIS, DoI, Emery Power Plant

In general this is a well developed environmental impact statement. It does, however, seem deficient in a number of respects:

1. While attention is properly drawn to the possible inter-relationships of a series of generating complexes in the Four Corners Region, we suggest that impacts upon water quality, water supply, and water diversion are characteristic of a number of projects in addition to the Huntington Project. We suggest that Table 1-2, p. 1-19, may merit reconsideration and amendment.

2. Attention is directed to the expanded demands upon water, sewage, health facilities, and social service systems in the several communities at risk. However, there is no discussion of the mitigative measures to be undertaken by State or local governments or by the utility to cope with the increased demand insofar as the Colorado River is concerned.

3. The problem of insufficient housing is identified, but no plan is outline to cope with the projected housing shortage beyond the natural play of supply and demand.

4. Generally, the consideration of water pollution is limited to saline pollution. There should be data provided establishing the basis for a finding that no other type of pollution will occur - if this is in fact the consensus of opinion.

4. Referring to the discussion of air quality, pp 3-9 ff, we are not persuaded that the fact that the project was undertaken before enactment of the EPA standards (40 CFR 52) in any way reduces the de facto desirability of installation of emission control equipment at the Emery plant.

5. Since there is likelihood that there will be a release of trace elements, including radioactive elements, it would be desirable for the utility to underwrite a continuing monitoring program on release of elements and their impact on plant and animal life in the area.

George H. Deming
Deputy Environmental Officer

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utah environment center
610 Judge Bldg., Salt Lake City, Utah 84111 · 533-0591

September 20, 1976

Mr. Paul Howard, State Director
Bureau of Land Management
University Club Building
Salt Lake City, Utah 84139

Dear Paul Howard:

Following are comments on behalf of the Utah Environment Center to Utah Power and Light Co.'s (UP&L) Emery Power Project currently under construction and the subject of BLM's recent draft EIS.

Cognizant of a growing population base in Utah, thus requiring additional power generation to meet the electic needs of said growth, makes commenting on the Emery Project difficult, at best. It is doubtful that had UP&L followed required guidelines established to direct procedure for plans of this nature, there would have been the need to criticize the Project to the extent we now feel compelled to.

UP&L has acted as judge, jury and executioner in determining the location of the power plant. This may be a violation of the National Environmental Policy Act of 1969 (NEPA) goals.

The issue at hand is not necessarily the determination of a suitable site for a power plant, but <u>which agency</u> is going to make that decision. (see BLM letter pg. 1-105)

Furthermore, this issue takes on greater importance as UP&L took it upon itself to begin construction of the Emery unit (an act that negates the relevance of alternative site proposals). They cite commencement date of construction (4/29/75) as reason for not installing SO2 scrubbers. We find this an inexcusable and a coercive and covert attempt to buck the 40 CFR 52.21 provisions that went into effect scarcely one month later (6/1/75). The question remains if a different site would have been selected would construction have begun prior to 6/1/75? We think not.

We feel that elimination of SO2 scrubbers from original plans is a signifcant alteration of the original proposal, since it will increase SO2 emissions by at least 80%. UP&L has proposed to put scrubbers on the Huntington Power Plant Second Unit--why not Emery? We also feel that UP&L's desire to eliminate SO2 scrubbers from the Emery complex would work against the goals and policies of the Clean Air Act and it's non-degradation clause, due to the proximity of the Emery unit and the national

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Mr. Paul Howard
Bureau of Land Management
September 20, 1976
Psge 2

forests on the Wasatch Plateau.

<u>Transmission lines</u> - We are aware of the opinion that there is a great need for further review and study of the impacts (socio-economic, welfare, health, ecological) that would result from having 345KV transmission lines through densely populated areas of Utah County. Public opinion received at the hearing held by the BLM in Provo on 9/9/76 seems to substantiate our position.

The DES is not correct in detailing the exact route of the transmission lines as it appears UP&L has changed the routing from those plans stated in the DES. We would like to know where the transmission lines are now being placed, and what criteria will be used in determining the new route.

<u>Coal</u> - Page 1-58 states "Only coal from the Hiawatha seam would go to Emery." The DES states that approximately 84 million tons of coal will be consumed during the 35-year economic life of the plant. Peabody Coal Co. estimates that <u>70 million</u> tons of Hiawatha coal exists in their lease areas. Of this, they estimate that 70% is recoverable (although later in the DES 57% is figured as recoverable). At the 70% recovery rate, <u>49 million</u> tons would be mined. Thus leaving Emery with an apparent <u>35 million</u> ton deficit of required coal. We could find no mention of this discrepency in the DES. We would like to know from where UP&L is planning to produce the extra low-sulpher coal for their plant?

<u>Mitigating measures</u> - The UEC suggests that UP&L post a "performance bond" guaranteeing that their power plant emissions will not exceed the stated emission levels. We feel that this is a viable and practical economic deterrent which insures that greater pollution does not occur. The performance bond has been used with great success in several states, since it bypasses the litigation and court action, and delay of time that would occur if a suit was brought for violation of stipulated emission levels. A performance bond would be of great public service, as UP&L would demonstrate it's good faith by supporting their contention that useage of a low-sulpher coal will not result in significant deterioration.

<u>Human resources</u> - Beginning on pg 2-78, the DES on human resources makes several assertions that are contradictory or ambiguos at best. For example, on the bottom of pg 2-78 "Carbon and Emery counties are <u>isolated from the rest of the state</u> by natural barriers; consequantly, <u>most socio-economic activity should occur locally.</u>" On pgs 2-82 and 2-83 we are informed that "Carbon and Emery C ounties have a <u>service based employment ratio lower than the national average</u> due to the nature of the rural economy and <u>proximity of other population centers</u>. Some goods and services are obtained...in Provo and SLC."

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Again on 3-76, "Since Emery construction started, employment in all sectors has increased." If there is a correlation between Emery construction and increased employment in all sectors, then table 3-14 fails to show it. If the statement is to be taken simply as "employment in all sectors has increased.", then the structure of the sentence should be done in order not to show a cause-effect relationship.

The same may be said again for the statement on pg 3-77, "If construction on the Emery complex continues, mining and other types of construction would continue to increase." In light of what is said on pg 2-93, this statement is not true.

If it is inteded as an open-ended comment, then the ambiguity in this and many other statements needs to be corrected.

Another example of inaccurate or incomplete information is found in table 2-15 on pg 2-80. This table lists the estimated population of communities in Carbon and Emery Counties. A sum of this figure shows the population to be 15,810. This figure does not correlate with the population figure of 26,022 cited at the top of the page.

The UEC requests that the BLM review the chapters on human resources so that a more complete and consistent projection of the impact may be realized.

Subsidence - The UEC requests further information as to what the federal land managers (i.e. U.S. Forest Service) plan to do about the serious problem of subsidence on over 4,600 acres of land on the Wasatch Plateau. In addition, approximately 180-acre feet of ground water may be lost due to geological disturbances caused by activities in the Wilberg Mine. The combined impact represents a seriuos long-term loss of wildlife, grazing and recreation activites. The UEC is very concerned about this subsidence problem since 1) it is occuring in many places along the Wasatch Plateau, 2) it will forever render thousands of acres of valuable forested lands unsafe for other uses.

Water - The use of 7,000 acre-feet of water per year, in our opinion, constitutes a major commitment of this precious commodity, especially in an arid, semi-arid part of the state. The UEC would like to see charts, tables, illustrations, etc., on how this water use is compatible with the hydrology of the area (see Hydrologic Inventory of the San Rafael Study Unit by Utah Division of Water Resources). Specifically, we feel that there needs to be explanations as to consumptive and non-consumptive uses of water by the power project and how it relates with other uses of water in that area.

Thank you for the opportunity to comment on this project. We will look forward to your reply.

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Sincerely,

Jan Johnson

Jan Johnson
Executive Director

P.S. Figures on per year SO2, NOX, and particulate emissions are anything but approximate, as reflected on pags 5-4 and 5-5. Would you please revise?

FRIENDS OF THE EARTH, INC. 529 COMMERCIAL SAN FRANCISCO CALIFORNIA 94111

September 10, 1976

District Manager
Richfield District
Bureau of Land Management
850 North Main Street
Richfield, Utah, 84701

Dear Sir:

Friends of the Earth and the Canyon Country Council, Colorado Plateau Office, have prepared the following comments regarding the draft Environmental Impact Statement for the Emery Electrical Generating Power Plant prepared by the Bureau of Land Management.

These comments are presented with the request they be considered in the planning process and included in the official hearing record.

Friends of the Earth is a national conservation organization committed to the preservation, restoration, and rational use of the Earth.

The Canyon Country Council is a newly organized conservation organization concerned with preserving the environmental quality of the outstanding scenic, natural, archeological, historical, recreational and river resources of the Colorado Plateau region of the American Southwest.

A number of subjects including those discussed in this statement need substantial improvement before the Emery EIS can achieve the intent of the National Environmental Policy Act.

The insistence of Utah Power & Light Company to continue with the construction of the Emery Plant, despite the urging of BLM Utah State Director Paul Howard to cease all construction activities, does indeed invalidate this Environmental Impact Statement and constitutes a violation of the Congressional intent of the National Environmental Policy Act.

Obviously, Utah Power & Light will not seriously consider any alternatives to the Emery Project and refuses to acknowledge the authority of the Bureau of Land Management to disallow the project or recommend alternative plant sites. In addition, this action by UP & L indicates a complete disregard or concern for the preparation of adequate data inadvance of the project's construction to insure the optimum protection of the environment.

Therefore, we strongly support the wisdom of Mr. Howard's request and urge the Bureau of Land Management to discontinue the preparation of the final Environmental Impact Statement until UP & L has ceased all construction activities on the Emery Project.

Another paramount consideration of the entire proposal is the relationship this project has to other energy developments planned for the region. At present, there are seven major coal-fired power plants operating in the Colorado Plateau region. Each of these plants has a planned operating capacity of at least 500 megawatts and five of them will operate at capacities over 1,000 megawatts. An additional six plants with a combined capacity of totaling 10,000 megawatts are currently under construction or planned for installation in the region before 1985.

Four of these plants, with a total of 6,360 megawatts planned capacity (I.P.P. 3,000 mw, Garfield 2,000 mw, Warner Valley 500 mw, and Emery 860 mw) would be located within the midst of several nationally significant natural, scenic and recreational resources in southern Utah. The combined output of these plants would be four times greater the power production proposed for the same time in any nearby state.

What will be the cumulative effects of power developments to the Colorado Plateau region? The draft EIS states (6-7) "there are presently insufficient data to definitely and finally evaluate long-term cumulative effects of the present energy development scenario on air resources, visibility and elemental build-up through long-range transport to areas of higher accumulation."

The National Park Service has stated in it s'Kaiparowits draft EIS comments "Fossil fuel plants have already had an adverse impact on the air quality in the 4-corners region. Existing and proposed sources of air quality impairment in the region threaten the integrity of many nationally significant resources including at least 20 units of the National Park System."

By endorsing a proposal-by-proposal approach to evaluating these massive projects, the Interior Department advocates a policy which would result in an adequate assessment of cumulative impacts only after all the projects are constructed and in operation. At that time, the integrity of the parks will have been sacrificed and discussion of suitable alternatives would be academic.

Accordingly, the Interior Department should prepare a comprehensive environmental impact statement to evaluate cumulative effects of the existing and proposed power developments within the Colorado Plateau. Such a regional EIS could determine how many, if any, power-related facilities should be allowed in the Colorado Plateau. In addition, the report could outline more suitable alternatives to the proposed mine-mouth electrical generating facilities.

The presence of the existing Southwest Regional Energy Study is persuasive evidence of the need for a suitable regional EIS.

The decision regarding any additional coal-burning power plants in the Colorado Plateau region, including Emery, should not be made until such a regional EIS is completed.

GENERAL EIS COMMENTS

The draft EIS is a product of a great deal of effort and presents a large amount of data in a fairly concise and well organized manner. The lack of repitition and excessive volume as compared to previous EIS statements prepared by the Utah BLM is greatly appreciated.

However, the lack of detail in Chapter 6 ,"The relationship between local short term uses of Man's environment and the maintenance and enhancement of long-term productivity," containing 19 pages, and Chapter 7 , "Any irreverssible and irretrievable commitments of resources which could be involved if the proposed action should be implemented," containing only 11 pages, indicate a serious lack of attention to these chapters, and their topics.

ELECTRICAL DEMAND FORECASTS AND ALTERNATIVES

The entire Emery Power Plant proposal is based upon the assumptions submitted by Utah Power & Light which indicates a total need of 3,028 megawatts of electrical energy required in the market area by the winter of 1980. During the 1975 through 1980 period, the company estimates an annual increase of 10.4%, some 4% greater than the expected national growth of electrical demand. There is no justification presented in the draft EIS for this growth in demand. In addition, no independent analysis of future electrical demands for the UP & L market area is presented. The EIS should contain at least an explanation of the forecasting methodology employed by UP & L in conjunction with the appropriate supporting data so that concerned individuals could arrive at their own conclusions.

The 10.4% demand growth rate predicted by UP & L for 1975-1980 implies a doubling of electrical capacity about every six and one half years. Should this growth rate continue, it would be necessary to construct four times the utilities' present capacity or 7,072 megawatts by 1989. This capacity would then require the installation of an 860 megawatt power plant, similar to Emery, every 18 months for the next 13 years. It is most certain that it would be quite impossible for UP & L to construct an additional eight Emery-sized coal-fired plants required to maintain such a rapid growth rate within this period.

Therefore, it would appear conservation will become the most important alternative to the production of additional electricity at ever-increasing exponential rates. The age of rapid growth in electrical capacity is over. Our society is now entering an era when investment in conservation is more beneficial than the construction of new generating capacity. The draft EIS does not fully and properly account for the reduction in electrical growth demand that conservation can and will have to make in the future.

Alternatives to the Emery Project, although not under consideration by UP & L, are not discussed in a comprehensive manner and do not provide sufficient information with which to evaluate their full environmental impact. Specifically, the alternative of increased utilization of renewable resources deserves greater attention. The draft EIS states (8-174), "The state of the art of solar power has not been developed to an extent that solar power can be considered a viable alternative." However, the Federal Energy Administration has stated, "recent analyses by several industrial firms have shown solar heating and cooling systems to be competive where there is high insolation and where costs of conventional fuels are also high." The applications of solar heating and cooling include between 25% and 33% of all U.S. energy use, according to the FEA Solar Energy report.

A large amount of additional credible data is currently available to indicate solar energy is a viable alternative to the construction of additional coal-burning power plants. The final EIS should more fully account for the availability of solar power as an alternative power source.

AIR QUALITY

The clean air of the region adjacent to the Emery plant is a national resource of great importance. The continued maintenance and future protection of this resource is of particular importance especially considering the plant site lies within a region containing the greatest concentration of scenic, natural and recreational resources in this country.

The draft EIS states (8-8), "the description of the project submitted to BLM by the Company contained no provision for SO_2 control." In another section, the draft EIS states "The proposed power plant lies within an area presently classified as Class II under the Federal Prevention of Significant Deterioration Regulations, 40 CFR 52. However, since construction of the Emery plant was approved in December 1973, these regulations do not apply." However on Page 8-127, the draft EIS states, "The EPA maintains that indeed the plant does fall under the authority of the Prevention of Significant Deterioration Regulations if the plans to include SO_2 scrubbers were cancelled after the regulation went into effect." The letter from EPA Regional Administration John A. Green to Verl R. Topham of the Utah Power & Light resolves any descrepancy involving the issue of the installation of SO_2 scrubbers with these statements;

"We have reviewed your recently submitted letter concerning proposed plans for three steam electric generating units in Utah (Huntington #2 and Emery #1 and #2) and the request for determination on the applicability of 40 CFR Section 52.21 contained therein. It is the determination of this Agency that the proposal to eliminate scrubbers from the described units would constitute a modification within the scope of the Federal regulations pertaining to prevention of significant deterioration. Consequently, such modification would subject the three generating units to the requirements of 40 CFR Section 52.21."

"Our conclusion is premised upon the finding that the elimination of scrubbers is a significant alteration to the originally approved design plan and that such alteration occurred after June 1, 1975, date specified in the Federal regulations. The alteration clearly fulfills the criteria set out in the definition of modification, 40 CFR Section 52.01 (d), in that it constitutes a physical and operational change resulting in a substantial increase of the SO_2 emission rate over the original base."

Therefore, there is little doubt that the Environmental Protection Agency will exercise its' authority to require the installation of SO_2 scrubbers on the Emery Plant. Why then does the BLM choose to refute the authority of this decision, assume the position of UP & L, and publish the draft EIS with the erroneous assumption that SO_2 scrubbers will not be an integral part of the Emery Plant's design?

Such an omission is a grave error as it directly contradicts the decision of the Environmental Protection Agency.

The final EIS for the Emery Project should correct this serious fault and assume the plant will be built with the required SO_2 scrubbers, whether or not they are included in the UP & L proposal.

Many of the assumptions made regarding the effects of the pollutants from the Emery Plant are very subjective and not supported by data contained in the EIS.

Regarding the yellowish discoloration due to NO_x emissions, the draft EIS states (3-18), "Such conditions have often been observed from emissions from each of the 750-MW units of the Navajo Power Plant (USPI,1976), but have not been observed from the 415-MW unit of the Huntington Power Plant (thus far)." Also, the draft EIS claims (5-7), "Similar emission rates and meteorological conditions existing at the Huntington Plant have not produced visible discoloration." and,"(3-26)," "The plume at the Huntington Plant has been virtually clear during operation thus far."

These statements sound somewhat familiar to the popular comment often made by UP & L officials and Utah politicians, who have stated, " A person standing next to the stack at Huntington would not be able to see any emissions." However, it is doubtful that these same observers would be able to detect any pollution should they be positioned in the middle of the plume.

It is very disconcerting to read such a similar and clearly erronous statement presented as factual data within an Environmental Impact Statement. It should be pointed out that many observers, including myself, have detected a noticeable and highly objectionable yellowish discoloration of the atmosphere that could be traced directly from the NO_x emissions from the Huntington Plant extending across the San Rafael Swell region.

The conclusions regarding visibility (3-27), "it is expected that the operation of the Emery Plant would not have a significant impact on visibility." and,(3-55), "The probable low volume of particulates and concentrations of NO_2 from stack emissions into the atmosphere of the region would not reduce the visibility and aesthetic experiences of the viewing public based on observation at the Huntington Power Plant," are not supported by adequate factual data. As previously noted, the pollutants from the Huntington Plant have been observed to have a noticeable effect upon the visibility and aesthetic quality of the air resources over the San Rafael Swell region.

The 83-92 tons of SO_2, 70 tons of NO_x, and 4.29-5.29 tons of particulates which will be the minimum amount of emissions from the Emery Plant daily will quite probably have a much more serous affect on the regions" air resources than the draft EIS is willing to concede. The final EIS should more correctly and objectively address these potential adverse impacts the Emery Plant will have on the air resources of the region.

TRACE ELEMENTS

The emission control equipment will remove much of the visible particulates, yet it is the invisible micron and sub-micron particles not controlled by the precipitators which pose the greatest threat to public health and welfare.

Several points should be made about the problems resulting from these particulates smaller than two microns which would escape the precipitators.

Toxic trace elements, including mercury, arsenic, fluorine, beryllium, cadmium, lead, molydenum, selenium, et. al., which are in the Hiawatha coal would be released during combustion. Volatile trace elements; fluorine, arsenic, mercury and molybdenum are emitted from the stack in the form of particulates less than two microns in diameter.

Large scale coal-fired power plants emit quantities of trace elements which are known to be hazardous to all biological species. The extent to which these elements enter the ecosystems is not well documented. However, a lack of documentation should not be assumed to correlate with a lack of significance.

Stationary fuel combustion already contributes 8.1x 10^6 metric tons or approximately half of the particulates emitted annually in the U.S. Particulates interfere with terrestrial infrared radiation, scatter solar radiation back into space, and reduce visibility. These meterological, geophysical, and climatic changes affect the entire globe. A marked reduction of visibility which is associated with these more serious changes has already been observed in the Four Corners area since the completion of several coal-fired power plants in that area. The draft EIS clearly indicates that the Emery project would further this degredation of visibility.

Particulates and gasses may undergo or act as catalysts for a variety of reactions which transform these substances into more toxic secondary pollutants. This is particularly true in the case of photochemical smog. Pollutant concentrations are directly related to the density of industry and the use of fossil fuels for power and space heating.

The size of particulates is extremely important. Fifty to eighty percent of particulates smaller than one micron are absorbed into the blood stream

and the use of fossil fuels for power and space heating.

The size of particulates is extremely important. Fifty to eighty percent of particulates smaller than one micron are absorbed into the blood stream

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from the lungs. Larger particulates are trapped by the respiratory system and directed to the stomach where the absorption rate is only five to fifteen percent.

The 4.29-5.29 tons of particulates emitted daily from the Emery project under ideal conditions would indeed be of a very toxic nature due to their small size. The draft EIS does not qualitatively describe the nature of these particulates and the extent to which whese elements could affect the area. A closer look at some of the elements contained in the emissions is helpful in assessing the magnitude of the problem.

During combustion, approximately half the fluoride in coal is emitted as gasseous hydrogen fluoride, silicon tetrafluoride, and particulate matter. From the total of 402.3 million tons of coal burned in the United States in 1968, for steam and energy production, fluoride emissions to the atmosphere have been estimated at 16,000 tons. Hydrogen fluoride or silicon tetra-fluoride are among the most toxic of all pollutants important to agriculture. Food chain concentration of fluorides has already been observed to affect cattle. Fluoride ingestion can cause osseous lesions, lameness, appetite impairment, decrease in weight gain or diminshed milk yield. Because the Emery project will be located in an agricultural area increased considerations of these toxic compounds should receive more careful analysis in the final EIS.

Radioactive emissions are not dealt with qualitatively in the draft EIS. The hazard associated with these elements and the half lives of the isotopes are not mentioned. The long-term genetic changes that could be induced by these elements should not be overlooked.

Coal contains variable concentrations of trace elements which are known to be harmful to man. Disturbance of soil, mining of coal, and the combustion process introduces these elements into ecosystems. The draft EIS assumes current measurements of trace elements are adequate. Current measurements are inadequate and the effects on the entire ecosystem and ultimate effects on man must be integrated.

The Emery draft EIS fails to adequately address the problem of trace element emissions andradionuclides by assuming these pollutants will fall within maximum safe concentrations. However, the draft EIS concludes (3-21), "Such trace metals may eventually accumulate in some ecosystems near the plant, but there are presently insufficient data to determine the amounts." and (3-23), "The long-term accumulation of trace element releases from power plants is not well known."

Overall, the passive attitude of measuring trace element increases does nothing to prevent or solve the long-term cumulative problems. Evidence from past developments indicates that trace element toxicity could be a problem of great enough magnitude to seriously effect the health of plants, animals, and man in the entire area. Therefore, more serious consideration should be given to dealing with these harmful contaminations in the final EIS.

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The statement regarding ozone (3-20), "there is presently no scientific evidence that the proposed Emery Plant would contribute to a violation of air standards with this pollutant." is not an adequate analysis of this pollutant. The cumulative effects of ozone pollution not only from the plant's emissions, but by the Corona discharge from the transmission lines should be quantitatively and objectively assessed in the final EIS. These considerations are very important considering the health and biological hazard posed by ozone.

SCENIC RESOURCES

The Colorado Plateau region is rich in outstanding scenic, natural, recreational and wilderness resources. The Bureau of Land Management administers extensive de-facto wilderness areas in the region including three primitive areas, a number of natural areas and recreation sites, several proposed primitive areas as well as two proposed national conservation areas, including the San Rafael Swell. This spectacular natural area will be gravely threatened by the effects of the Emery Project and it's associated population increase. The final EIS for the Emery Plant should contain a more detailed assessment of the effects the project will have upon this area's wilderness resources and propose suitable mitigating measures to minimize these environmental impacts .

Thes comments are respectively submitted for your consideration.

Sincerely,

Gordon Anderson

Gordon Anderson
Colorado Plateau Representative
Friends of the Earth

GA/ha

cc: Secretary of the Interior
Director, Bureau of Land Management
Utah State Director, BLM
Utah Director, National Park Service
Regional Administrator, Environmental Protection Agency
Director, Council of Environmental Quality
Conservation Organizations

These comments are endorsed by: The Wilderness Society
Canyon Country Council
Wilderness Resources Institute

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United States Department of the Interior

GEOLOGICAL SURVEY

September 23, 1976

In Reply Refer To:
MS-760

Memorandum

To: District Manager, BLM, Richfield, Utah

From: Chief, Preparation Branch, EIA Program

Subject: Draft Environmental Impact Statement, Emery Power Project, Emery County, Utah

The following comments are intended to aid you in the preparation of the FES and are intended to be considered as informal recommendations and suggestions.

Chapter 1

Appendices

1-3, Check page numbers against Table of Contents.

Page 1-9, Table 1-1

Under Coal--70,000,000 tons from Hiawatha seam of Wilberg Mine, should add "and vicinity of Wilberg Mine."

Page 1-17

1. Generating Stations. Why not include both Gadsby Plant in Salt Lake City, Utah, and Naughton Plant in Kemmerer, Wyoming?

2. Mineral Development. Add "approximately" before "5,000,000 tons." On pages 1-17 and 1-20, the projected increase in coal production from approximately 5 million tons in 1973 to 20 million tons in 1979 for Carbon and Emery Counties is too high. Under past, present, and projected production estimates, a figure of 10 million tons of coal in 1979 appears more realistic.

The above tonnage figure is based upon the following estimated yearly production:

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

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Year	Federal Leases	Fee Lands	Total
1972	2,000,000	2,500,000	4,500,000
1973	2,160,000	3,080,000	5,240,000
1974	3,200,000	1,600,000	4,800,000
1975	2,520,000	1,980,000	4,500,000
1976	3,440,000	2,460 000	5,900,000
1977	5,000,000	1,600,000	6,600,000
1978	6,100,000	2,000,000	8,100,000
1979	7,400,000	2,600,000	10,000,000

The figures above are dependent upon completion of proposed units in both the Emery and Huntington generating plants, completion of proposed EIS's to cover areas involved, existing and possible future governmental regulations, and future market outlets. It takes considerable time to achieve production, as this is dependent on environmental and related studies, design and obtaining equipment, design and construction of plant facilities, mine buildup, and proper training of labor force.

The 20 million tons of coal to be produced in Carbon and Emery Counties by 1979, as estimated by the College of Eastern Utah, et al., 1974, is believed too optimistic under present conditions. The advantage of low-sulfur coal in Utah is offset by high costs of mining and transportation, as well as competition from producers in both Montana and Wyoming. Possibly, that same 20 million ton production figure can be obtained in an additional 10-20 years or by 1990 or 2000, and then only if markets are available. Only time can prove the worth of any present estimates.

Page 1-20, Table 1-3

Southern Utah Fuel is in Sevier County, not Carbon or Emery.

Both Belina and Routt Counties are located south of Scofield, Utah.

Item 3 should read "Consolidation," rather than "Consolidated."

The sixth item, Routt County, is not clear. Many westerners know that there is a Routt County in Colorado, but are not aware of a coal mining enterprise that has adopted that name.

Page 1-20

Perhaps some information should be included as to oil and gas leasing in the area.

Page 1-25

Bring information on Clean Air Act up to date.

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Page 1-33

The last line mentions that "the two boilers could consume 2,400,000 tons of coal and produce about 248,000 tons of ash annually at a normal operating rate of 80 percent maximum output." We believe that boilers do not consume coal or produce ash. It would be better to reword the sentence and mention each generating unit would consume coal and produce ash, instead of the word "boiler." The Dictionary of Mining and Mineral Terms quotes "boiler" as "portion of a steam generator in which water is changed to steam."

Page 1-56, Table 1-6

Explanation of "at maximum production" and "annual maximum consumption" is needed for clarity.

Page 1-56 and Figure 2-6 of Chapter 2

B. Coal leases.

Federal lease numbers and locations are not given. A map showing leases and coal ownership in adjacent areas should be included. Surface ownership should also be delineated on a map.

Pages 1-56 through 1-63

C. Mine plan.

The description of the underground mining operation, both exploratory and proposed, is adequate. The details of the proposed mining sequence of the Hiawatha and Blind Canyon seams are not addressed. The temporal and spatial relationships between the Deer Creek and Wilberg mining operations are unclear. According to the discussion on page 1-56, the detailed mine plan will not be forthcoming until completion of exploration in 1978. Nonetheless, this aspect of the EIS cannot be considered complete or adequate until the details of the mine plan, if not the plan itself, are available.

Page 1-58

Line 6. Change 70 percent to 57 percent.

Fifth line from bottom of page. Add "or follow EPA, State, and Forest Service discharge requirements at the Wilberg Mine."

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Chapter 2

Pages 2-25 through 2-30

A. Geology.

The description of the geology of the area surrounding the Wilberg Mine is too brief. The structural and stratigraphic relationships between the coal and other formations have not been addressed. A revision of this section should include the following:

(1) A geologic map on a topographic base (scale of 1:24,000 or larger) of the area, extending from the Deer Creek Mine to the Emery site.

(2) A complete stratigraphic column, with descriptions of the formations both above and below the coal seams.

(3) A description of the structural relationships and topographic characteristics of the formations.

(4) A site specific description, including maps, of the coal characteristics, stratigraphic relationships, and overburden thicknesses for both seams.

(5) A general description of coal reserves in the Wasatch Plateau and history of development (including past, present, and future mines on Federal, State, and private lands).

(6) A more complete discussion of oil, gas, uranium, and other mineral development in the area, the relation to coal development, and cumulative impacts of such developments.

Page 2-25

The initial discussion of geology is made in Chapter 2. While it is apparent that subject material in an EIS is handled in a succinct manner, it appears that the discussion of geology is weakened by being too brief. For example, the names of the coal beds (Hiawatha and Blind Canyon) are not mentioned. The coal beds are identified by name in the introductory chapter on page 1-58. However, we feel they should be treated in Chapter 2, where the principal discussion of geology is found. Only a brief account of stratigraphy is given, and then only for rocks above the coal bed. No mention of the stratigraphic sequence below the coal could be found.

Although the structure is relatively simple, a more fully developed discussion of the coal structure and relationship to the regional structural pattern would improve the presentation.

The remaining chapters have headings for geology and are quite properly brief and to the point. An expanded discussion in Chapter 2, as already indicated, would improve the EIS.

We could find no mention of existing oil and gas leases in the Wilberg Mine area or in the power plant area. A telephone call to the BLM elicited the information that oil and gas leases do cover the mine area. Some discussion of the impact of possible oil and gas exploration over the mine area is necessary. This would also hold for the power plant area and ancillary portions of the project.

It is difficult, in many instances, to make precise cadastral locations, because many of the maps do not have adequate marginal information to pick out township and range numbers. In some instances, the section numbers are missing.

<u>Page 2-27</u>

Check List of Illustration, Figure 2-28, is on page 2-24.

Line 2, It might be better to take out "Nearly Level."

Line 7. The spelling of "Stokes" is wrong.

North Horn Formation. Change "Approximately" to a small "a."

Third line from bottom. It might be better to add "effects of" before "gravity."

<u>Page 2-29</u>

"Fractures" would be a better word to use than "cracks."

<u>Chapter 3</u>

The environmental aspects of the coal mining operation have not been adequately addressed. More detail should be included for the following:

(1) The chemical and physical impacts of mining on the hydrologic system.

(2) The areal extent, magnitude, and duration of subsidence.

(3) The effects of subsidence on soils, water resources, vegetation, land use, and human safety.

(4) The cumulative impacts of the Deer Creek and Wilbert Mines and other operations in the area.

Check page numbers with Table of Contents.

<u>Appendices</u>

<u>Page 3-94</u>, Appendix 3-1, Magnitude of Contrast, is missing from the draft.

<u>Tables 3-6, 3-7, 3-8, Appendix II-3</u>

A. Transmission line impact.

The figures on Tables 3-6, 3-7, and 3-8 are based on the disturbance of .25 acres per tower. These figures do not appear to reflect the additional disturbance due to the clearing of "hazardous" vegetation along the right of way. There are several areas of deciduous or coniferous forest in areas with moderate to high potential for landslides and soil erosion (Appendix II-3). This possible impact should be further explained.

<u>Chapter 4</u>

<u>Page 4-11</u>

2. Geology and Topography.

Change "is no practical" to "are no practical means," etc.

<u>Chapter 5</u>

<u>Page 5-7</u>

Fourth line from bottom. Change 70 percent to 50 percent.

<u>Page 5-8</u>

Line 5. "Fractures" would be a better word to use than "cracks."

<u>Page 5-3</u>

B. Unavoidable adverse impacts.

It states that "many of the impacts identified here can be avoided, but because of lack of regulations, policies, or other incentives, they most likely would not be." This needs clarification. Some impacts should be identified, along with possible sources of mitigation (such as the enforcement or establishment of county, State, or Federal regulations, policy changes, etc.)

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Chapter 8

Page 8-100

Paragraph 4, line 2. "About 150 additional miners would be needed." From page 2-82, it was noted that 350 miners are in the Deer Creek Mine and, with 150 additional, there would be only 500 total miners involved. At least a total of 600 (latest proposal) are needed. Accordingly, we suggest changing 150 additional miners to "About 250 additional miners would be needed." This change should be reflected on page 2-82 as well.

Pages 8-113 through 8-126

The footnote on Table 8-13, Summary, Environmental Impact Rating, (page 8-115) indicates that the matrix for the Emery Project is included in the Foreward, which it is not. From data in other tables, the impact score for Emery is 58, higher than the alternative Huntington and Sevier sites and lower than the Garfield sites. These impact scores form a basis for site selection. The rationale for selecting the Emery site over the alternative sites is not clear from discussions in the EIS.

Page 8-131

List of Illustrations. No page number.

Page 8-145

Line 3. Change "from the Wilberg-Deer Creek mining complex" to "from the Wilberg-Deer Creek mining complex and adjacent leaseholds."

Page 8-147

Line 2. Change "more coal can be removed from the face" to "more coal can be removed from the face in a single operation."

General Comments

In many cases, page numbers do not agree with Tables of Contents.

D. Maps and Figures (all Chapters). Most of the maps have no scale or spatial references (township, range). Wherever possible, surface ownership should be indicated on maps and figures.

Since the operating Number 1 generator at the Huntington power plant was destroyed, we believe some comment should be mentioned concerning a like occurrence or extended "outage" at either plant in the future and the overall impacts on the area.

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Likewise, some thought might be given to an explosion, cave-in, extended work stoppages, etc., at the mines supplying coal to the generating complexes and the impact involved.

Not only do we need to know about the coal availability in the vicinity, but about possible importation of coal from other areas to maintain generating capacity, if circumstances did not permit the use of local coal.

General Comments on Water Resources

In general the draft statement is adequate in its consideration of most ground-water impacts. We suggest that dewatering impacts on ground-water levels in the area surrounding the project construction site should be considered. Furthermore, although the quality of the shallow ground water seems to be rather poor at the construction site, the statement should consider monitoring at least one or more key or diagnostic constituents in the immediate vicinity of any ponds containing high concentrations of pollutants, to determine the integrity of the liners.

It is indicated that two existing drain fields are discharging ground water from the construction area containing about 9,000 parts per million of total dissolved solids at a rate of about 80,000 gallons per day (p. 1-55, par. 3). The location and hydrologic characteristics of the ground-water drainage disposal area should be evaluated in order to minimize any adverse effects on existing water resources of the project area.

The frequency and magnitude of flooding of Rock Canyon Creek should be assessed in order to minimize any adverse effects on the power-generating complex resulting from high intensity thunder storms (p. 2-46, item b.(11).

Baseline data on water-level fluctuations of Snow and Flag lakes should be obtained in order to assess any adverse effects on lake-level changes that may result from mine subsidence (p. 5-11, par. 2).

Charles M. Albrecht

Charles M. Albrecht

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UTAH CHAPTER, SIERRA CLUB

SUPPLEMENTARY COMMENTS
ON
DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR
EMERY POWER PROJECT

Submitted, September 23,1976 by

Nina Dougherty
225 South 12th East
Salt Lake City, Utah 84102

With additional comments by

Sherman Janke

Utah Power and Light's action before completion of EIS

Utah Power and Light has shown a high disregard for the public and for the environmental assessment process by proceeding with construction before issuance of the environmental impact statement on the project, and before obtaining the rate increase which it has insisted was necessary for continued construction of the power project. In each case UP&L's action did serve and will serve to exert undue influence on the decisions to be made. BLM is to be commended for including information in the DEIS that sheds light on the sequence of events surrounding the initiation and preparation of the DEIS and the construction of the Emery units.

SO_2 emissions control

The Sierra Club supports EPA's position that the units are subject to meeting incremental limitations of Class II. The State of Utah and UP&L contend that scrubbers are not "practical". The Sierra Club contends that scrubbers are practical and that 92 tons per day is an excessive amount of SO_2 to be issued from one source. We take issue with statements on p. 8-129, "In other words, significant impacts from SO_2 would not be expected even with no control. Therefore, with control and lower emission rates there would also be no impacts, regardless of whether the control would be 80 percent or a lower level." Such statements reflect a position on NAAQS considered by many to be untenable--namely, that all atmospheric and all long term low level health effects are known, and that there are no ill effects or that there is a threshold in level of pollutants below which there are no effects. The State's position on "practical" is in fact based on the contention that there is no threshold below which there are no effects and, therefore, that control should be on

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a cost/benefit basis as long as NAAQS and NSPS are met--presumably the fewer people living in Castle Valley area do not present enough of a benefit potential to compensate for the cost. (Since we are concerned about the aforementioned potential effects we do not accept the State's stance on cost/benefit practicality.)

On p.8-101 it is stated that the second uint of Huntington is planned to have a scrubber which will remove 80% of SO_2 emissions. The table on p. 8-107 shows emissions predicted when all four Huntington units are operating, three of them with scrubbers for SO_2 removal. It is, of course,not planned at this point that there be a scrubber on second Huntington unit--what is the assumption about SO_2 removal for second Huntington unit in studies done to predict interaction of Emery and Huntington SO_2 emissions?

Coal

To clarify the picture on where all of the coal will be mined for the first two Emery units, the options in Chapter 8 should not be considered merely alternatives but part of the description of the project in Chapter 1--that is, if any of those options are to be used. If the coal is to come from elsewhere, that coal and mine should be described. It would be more helpful to state in Chapter 1 the amount of coal that would be used from Wilberg Mine Hiawatha seam than what exists in the seam--this would more clearly indicate the coal situation. There should be a trace analysis of the coal to be used.

DEMAND

In describing some of the manufacturing and mining projects that will use energy from these Emery units, there should also be an identification of the amount of electricity scheduled for the Moon Lake REA that is slated for oil shale projects. The White River Shale Project intended to use at least some electricity from Moon Lake REA. Also, how much of electricity for California Pacific Utilities Co., if any, is intended for the alumina project near Milford?

SOCIOECONOMIC

A correction that needs to be made that hopefully reflects only hurried writing and lack of thought rather than some deeper or stronger feeling is the description of Emery County as being ethnically "almost entirely white", while Price and Helper are described as being ethnically "Greeks, Italians, Spanish-Americans

and other ethnic groups." (p.3-87)

The DEIS should include the costs to the county and to the people of having power plant and additional population. Energy project EIS' are particularly good at indicating tax and income benefits as if they are an absolute total gain with no additional financial costs to the people in the area. It would be helpful to show budgets of other energy impacted counties to show costs as well as benefits--in order to get a truer picture. The buying power of the income should also be indicated as the energy boom increases.

ENERGY CONSERVATION AND ALTERNATIVES

We consider conservation to be the first and most important alternative and, therefore, look critically at the attitude and analysis of potential for energy conservation that is displayed in an energy project EIS. The energy conservation section in this DEIS does most decidedly suffer from lack of committment in portraying what energy conservation can do. We in the Sierra Club are well known for believing that energy extraction and conversion projects can have adverse impacts. We, therefore, take EIS' seriously and persist in trying to shape them into vehicles that will honestly and objectively display all of the impacts and all of the possible alternatives. Alternatives (and their impacts) become very important when impacts are perceived to be undesireable enough.

The conservation section is inadequate in various ways. It doesn't even pretend to show what the potential for conserving energy is, dwelling instead on apparent lack of incentives in Utah for conserving energy. It also cites a 1972 study prepared in the infancy of federal acceptance of the idea of conservation of energy as being valid.

It is not really valid to consider the potential for energy conservation only in terms of existence of incentives to bring it about. It is more important to show how much energy can be conserved in various time frames--adverse impacts of yet one more energy production project and the knowledge of how much energy it is possible to save can provide the incentive to legislate incentives. Cost of energy to the consumer as rate increase requests occur with each new project will provide more incentive to save, also. It cannot be said that there was not substantial public interest in the last UP&L rate increase request hearing.

The discussion of incentives is already outdated because of legislation enacted in August which does provide loan guarantees to help finance purchase of energy-conserving equipment by some public institutions and owners of large apartment buildings and small businesses, as well as loans and loan guarantees to homeowners or renters who insulate homes, some free insulation for homes of low-income persons, and a requirement that HUD formulate energy construction standards to be incorporated in local building standards.

The other energy alternatives generally suffer from the usual narrow interpretation of what it is valid to consider alternatives for. The assumption in this and other EIS' is that the only true alternative to a large coal-fired power plant is one of same size fueled by oil or gas or is nuclear or is solar powered or wind powered. Lip service is paid to direct use of solar energy, but only lip service. Energy has been supplied in a variety of ways in the past and it certainly can be in the present and future. What is particularly lacking in the energy alternatives is the concept that alternatives for the end use of the amount of energy which could be supplied by the power project are to be considered. The idea that a combination of types of energy; centralized, decentralized or direct facilities or use; size of facilities, etc. can be considered is apparently alien to those preparing energy alternatives options. Utility companies want to keep power production centralized and under their wing (witness the court battle Boston Edison Co. waged when Harvard attempted to set up a total energy plant for a hospital and housing complex); impact statement teams probably just consider it much simpler to limit alternatives to another means of generating the same amount of electricity in one site.

Energy alternatives and conservation sections of energy project EIS' very much need improving. It would seem useful if there were a central federal office that provided the basic information, incorporating at least all of most current federal thinking, trends, and legislation in those areas--the local considerations that might need to be added to the scenario could be added by the team for the particular EIS. We would, of course, prefer to see not just current federal input but that of all or the major nonfederal energy policy thinktanks.

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Comments pertaining to the Draft Environmental Impact Statement, Emery Power Plant, prepared on behalf of the Utah Chapter, Sierra Club, by Sherman H. Janke.

The following is divided into two sections: the first includes suggestions for improvement of the Draft EIS, and the second, recommendations regarding the plan of the Utah Power and Light Company for implementing this project.

I. Suggestions for correction or improvement of the Draft EIS.

a. On mitigating measures, Chapter 4, p. 4-11: the statement is made that there is no practical means to mitigate the addition of from 83 to 92 tons of sulfur dioxide per day. If one accepts the company's plan of not including scrubbing equipment in this power plant (which is evident from the Ch. 1 description of the plant and from paragraph 2.(a) of page 5-4), this may be true. Yet it seems reasonable that in a chapter on mitigating measures, reference ought to be made to how the quantity of SO_2 released could be reduced through the incorporation of scrubbing equipment. I realize that such consideration is made in Ch. 8 but it should also appear in Ch. 4.

b. In Chapter 5 regarding adverse impacts: The second portion of section 2(a) page 5-4 is unclear: apparently the population increase in the area of the power plant, occasioned by its construction, would, through the normal activities of this population, result in SO_2 emissions of about 200 tons per year in addition to SO_2 emissions from the plant itself. However this is not too evident from the present wording of this paragraph.

c. In the consideration of alternatives, chapter 8. On p. 8-9, it is stated that "consideration of the Naughton site...was discarded (as an alternative to Emery) because that site has become a firm proposal for another project." I should like to know exactly what this firm proposal is, and whether it involves further plans of UP & L or some other utility company.

d. Continuing in Chapter 8: On Figure 8-1, p. 8-10, the transmission line corridor from the Emery-Huntington area to Sigurd is indicated as "proposed." Is it not true that there is already a corridor along this route for an existing power line commencing at the Huntington plant? (Refer also to page 1-78 for a statement to this effect.)

e. In the next-to-last paragraph of p. 8-45, in the discussion of a low-voltage line which might service a Garfield plant, mention is made that this 69 kV line could be of a type which would electrocute large birds of prey. I would appreciate some amplification as to what type of line would do this, and how.

f. Table 8-13, p. 8-115, the Summary of Environmental Impact Ratings: The footnote appears inaccurate, as I was unable to find this matrix with Emery included. However, if one takes the Emery impact ratings

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from the tables which follow Table 8-13, he arrives at a total impact score of 58 for Emery. Interestingly, this is about midway between the lower scores of Sevier and Huntington and the higher scores of the Garfield sites.

g. On the cooling tower discussion beginning page 8-136. While it is true that Chapter 8 is a discussion of alternatives, it would be helpful for purposes of comparison if coal usage figures and thermal performance numbers were included for the proposed wet-dry cooling towers. That is, how much more coal would be required to fuel the wet-dry tower cooled plant in comparison with a plant cooled with wet (only) towers? What is the penalty in thermal efficiency of the wet-dry cooling system over the wet-only method, and how much additional thermal burden does the wet-dry system impose on the surroundings? On page 8-139 these comparisons are made for the dry system vs. the wet-only towers and a similar analysis for wet-dry vs. wet-only would be helpful.

Elsewhere in the EIS it is stated that the company would operate the plant as wet tower cooled in the summer and as dry cooled in the winter. From thermodynamical considerations this makes sense, yet there appears to be a contradiction in turbine requirements, judging from the next-to-last paragraph of p. 8-139: how can one turbine be operated at outlet conditions typical of a wet tower system for part of the time, and operated at higher back pressures occasioned by the towers operating dry at other times? An explanation of this point would be helpful.

II. Preferences on the implementation of UP & L's plans

a. On transmission line routing: our suggestion for the Emery-Spanish Fork-Camp Williams route coincides with the alternative outlined on page 8.161. Connecting lines at the Carbon plant would eliminate the new corridor past the Scofield Reservoir and would have the advantages listed on p. 8-163. We strongly urge the implementation of this somewhat longer route along with the upgrading of the existing 138 kV lines from the Carbon plant.

b. On future plans of Utah Power and Light Company: looking beyond the Emery plant, which one might call a fact in view of its being under construction, the Utah Chapter of the Sierra Club strongly opposes the location of any power plant in the Escalante region and in particular the Garfield sites. Should it be judged in the public interest that additional plants be constructed, we suggest the Sevier site as worthy of investigation, and refer again to Table 8-13 which indicates this site as having the least potential environmental impact.

Sherman H. Janke

Sherman H. Janke

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Calvin L. Rampton
Governor

James Edwin Kee
State Planning Coordinator

STATE OF UTAH
Office of the
STATE PLANNING COORDINATOR
118 State Capitol
Salt Lake City, Utah 84114
(801) 533-5246

September 21, 1976

Paul Howard, State Director
Bureau of Land Management
Department of the Interior
University Club Building
Salt Lake City, Utah 84111

Dear Mr. Howard:

Attached are comments from various State Agencies concerning the review of the Emery Plan Environmental Impact Statement.

In general, the State's position is one favoring the plant and the mining operation; however, there are some problems contained in the attached letters that must be resolved prior to the completion of the development.

Additional comments will be forwarded as received.

Sincerely,

James Edwin Kee

James Edwin Kee
State Planning Coordinator

JEK/jn

Enclosures

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TRANSPORTATION COMMISSION

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Director
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Assistant Director
C.V. Anderson, P.E.

UTAH DEPARTMENT OF TRANSPORTATION
State Office Building
Salt Lake City, Utah 84114

September 21, 1976

Mr. Chauncey Powis, Chairman
Environmental Coordinating Committee
State Planning Office
118 State Capitol Building
Salt Lake City, Utah 84114

Dear Chauncey:

After reviewing the Emery Power Plant Draft Environmental Statement, we should like to submit the following comments:

The Utah Department of Transportation is concerned about the continued safety and well being of all users of the three State Roads effected by the project -- SR's - 10, 57 and 29; accordingly, until 1980, when the coal conveyor has been put into operation and has entirely replaced the coal haul road, measures must be taken to mitigate the hazard that these trucks pose for through as well as local traffic using these roads. The Utah DOT feels that where these heavy vehicles will be either entering or crossing these State Highways, it should be reimbursed by the Utah Power and Light Company for any flagging, signal control devices or channelization of intersections that are necessary.

The Department is also concerned about a 2.5 mile section of SR-57 and a 1.0 mile section of SR-29 that, under the present proposal, would be used as part of the 12.5 mile haul road. With the passage each day of 216 trucks, each carrying 30 tons of coal, the expected life of these roads will be greatly diminished; therefore, we again feel that reimbursement is necessary for whatever additional layers of pavement are required in order to maintain a means of transit that will continue to be safe and convenient for all users.

In conclusion, after reviewing current as well as projected figures on ADT and peak hourly volumes for these roads and taking into consideration the additional mining and generating plant personnel required by the proposal, the Department continues to feel that the State Roads, as they exist here, will be able to satisfactorily maintain traffic flow; however, there may be a need for minor flattening of curves or widening of alignment for spot safety improvements.

Sincerely yours,

C. V. Anderson

C. V. Anderson, P.E.
Assistant Director

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state of utah

DIVISION OF WILDLIFE RESOURCES

DONALD A. SMITH
Director

1596 West North Temple/Salt Lake City, Utah

RECEIVED
NOV 8 1976
STATE PLANNING OFFICE
STATE OF UTAH

November 3, 1976

Mr. Chauncey Powis, Chairman
Environmental Coordinating Committee
State Planning Office
State Capitol Building
Salt Lake City, Utah 84114

Dear Chauncey:

Enclosed are our revised comments on the Draft E.I.S. Emery Power Plant. These will replace our earlier comments; thus, please disregard our previous correspondence on this project.

Sincerely,

Donald A. Smith
Director

Enclosure

cc: Department of Natural Resources

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state of utah

DIVISION OF WILDLIFE RESOURCES

DONALD A. SMITH
Director

UTAH DIVISION OF WILDLIFE RESOURCES COMMENTS
ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE EMERY POWER PLANT

October 12, 1976

The Draft Environmental Impact Statement for the Emery Power Plant, recently prepared by the Bureau of Land Management, leaves many questions unanswered. The following comments convey the Division's concerns with respect to both the proposed construction and the Environmental Impact Statement.

The Statement covers proposed construction of two 430 megawatt coal-fired steam-electric generated units by Utah Power and Light Company in Emery County, Utah. Three 345 kilovolt transmission lines will be constructed. One will extend from the plant to Sigurd, Utah, and the other from the plant to Camp Williams, Utah. A third transmission line will be constructed to tie the Sigurd and Camp Williams substations together. Coal for the plant will be supplied from the Wilberg Mine in Grimes Wash located about 13 miles northwest of the plant site.

The area considered by this statement is defined as the Primary Influence Zone (Figure 2-26 on page 2-74) described as any area that can be reached within a two hour drive from Price, Utah.

Description of the Proposal, Chapter One

We recommend landscaping of the plant site with shrubs, trees and other vegetation that will provide food and cover for wildlife species compatible with operations at the plant.

Many species of avifauna will inhabit the plant site if adequate vegetation is provided. Some trees and shrubs that would provide foods edible to wildlife and still be aesthetically pleasing as ornamentals are mountain alder, sand cherry, rose, Siberian pea, honey locust, Russian olive and cedar. This list is only suggestive since a complete tabulation of trees and shrubs acceptable to wildlife would be lengthy. A diversity of plant species would provide food and cover for a larger number of avian species. This would be especially true during spring and fall when migration causes a wide variety of bird species to pass through the area.

The coal conveyor system consists of two parts. The first part, an 8,000 foot feeder conveyor from the Wilberg Mine down Grimes Wash to a coal storage area, would be put in operation at the start-up of the first generating unit (page 1-64). It is noted that in the Environmental Impact Statement Report prepared by Peabody

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Coal Company in September, 1975, this conveyor section is specified as being 6,300 feet in length. Neither the statement prepared for the Wilberg Mine by Peabody nor the Draft Emery Environmental Impact Statement allude to the necessity of deer crossings along this first section. Provisions for wildlife migration, especially deer, in this area should be detailed in the Final Emery Environmental Impact Statement. Also, the Statement is contradictory since on page 1-64 the length of the feeder conveyor from the mine portal to the storage yard is listed as 8,000 feet and on page 1-74, the feeder conveyor is described as being 6,300 feet long, which is the figure used in the earlier Peabody report.

The second segment of the conveyor system is described as being 13.3 miles long. It starts at the end of Peabody's "6,300 to 8,000" foot long conveyor system and extends to the Emery Plant coal receiving building. This segment includes five transfer conveyor sections and will be constructed for use when the second unit of the Emery Plant is put on line.

Actual length of the total conveyor system and its individual components are in conflict. By totaling the distances reported in the Draft (pages 1-72 and 1-73) under conveyor sections 1 through 5, (this represents the distance from the coal storage yard to the Emery Plant) a combined length of 12.8 miles (1.85 + 1.62 + 3.84 + 2.69 + 2.08) is provided. This disagrees by .5 miles with the statement on page 1-72 that the total length from transfer at point No. 1 to the Emery Plant coal receiving building would be about 13.3 miles. Also, a statement on page 1-64 indicates the entire length of the coal conveyor system will be 13.5 miles long. If the Utah Power and Light section of the conveyor is actually 12.05 miles long and the feeder conveyor 8,000 feet long, then the total system would be 13.6 miles long.

On page 1-71 it states that "provisions would be made for 24 deer and cattle crossings under the conveyor system at known game trails". A field trip with Utah Power and Light Company's environmental staff in July, 1976, indicated there were no known game trails and that locations for deer crossings could only be identified as low areas or washes the conveyor would likely cross. All of these supposedly "Game" crossings are only generally located since the exact "known" and specific route of the conveyor system is not marked on the ground. Twenty-four crossings are identified on the map on Figure 1-23, on page 1-67. An examination of the text (pages 1-72 and 1-73) shows a description of only 21 crossings under conveyor sections 1 through 5. The map shows 22 crossing points in this same area, plus two additional crossings under the feeder conveyor. Additional clarification in this area of the Draft Statement is needed.

We recommend the length and location of the conveyor belt together with specific locations of deer crossings be delineated in more detail in the Final Environmental Impact Statement. Deer crossings should be located to an exact point so the Division may evaluate the probability of their use by deer. The feeder conveyor section will require numerous deer crossing points. Conveyor section No. 1 has only two crossing points. At least four additional crossings should be provided for deer along this section. The number of deer crossings in conveyor sections No. 2 and 3 are considered adequate. Deer movements in the Grimes Wash area will be most concentrated between the mine portal and the end of

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conveyor section No. 1. Conveyor section No. 4 should have additional deer crossings to allow deer migration and daily feeding movement off Johnson Bench into adjacent agricultural areas. Conveyor section No. 5 should be provided with additional crossing sites on the West end near the junction with conveyor section No. 4.

Coal haul traffic, assuming 30 tons of coal per truck, will consist of about nine loaded trucks per hour during a 16-hour period each working day. This amounts to one loaded and one empty coal truck passing any given point along the haulage route every seven minutes of a working day that coal is hauled. The coal haul road passes through 7.5 miles of deer winter range and agriculture areas used extensively by deer. Mortality to deer resulting from collisions with coal trucks will be significantly increased considering the frequency and speed of coal truck traffic through this area.

Potable water for the plant site will be provided from the Clawson water system. The Draft Statement fails to mention the amount and types of habitats which will be disturbed while constructing the culinary waterline (page 1-74).

Industrial water will come from Millsite Reservoir located three miles west of Ferron, Utah. An 11 mile long pipeline will bring water to the plant site. Installation of this line will disturb 33 acres of land. Sixteen acres (48 percent) of this land are very productive as cover and food for wildlife, especially pheasants, cottontail rabbits and doves. The remaining 17 acres are greasewood and saltbrush that provide marginal wildlife habitat. The pipeline will be reseeded, but an 8-foot wide access road with a dirt surface will permanently occupy 10.7 acres along the pipeline route. Habitat lost to this road should be quantified.

Service roads for construction and maintenance of the transmission lines will be needed (page 1-82). Existing roadways will be used, but 40 miles of new road will be required between Wattis and Gilluly. About 20 miles of this road will be permanently maintained after construction is completed. The Draft Statement fails to identify the area in which the roadway will remain open or the number of acres and type of habitat lost temporarily or permanently due to road construction. We recommend the portion of roadway to be maintained should be restricted to Company maintenance traffic only.

It is expected that about 780 tons per day of ash will be produced by the burning of coal at the plant (page 1-85). The ash disposal area has been inspected by Division personnel. During the 35 year projected life of the plant, ash would cover 160 acres of land to a depth of 15 to 25 feet. The ash disposal area is characterized by flat rolling terrain. The primary vegetation community is saltbrush and Indian ricegrass. Rehabilitation plans appear to be adequate. Reseeding attempts should be continued on all disturbed areas until success is accomplished.

The construction work force at the plant will peak at just over 1,000 workers. After construction is complete, 203 workers will be needed to operate both units of the plant. At maximum production for plant operations, the Wilberg

Mine will employ 600 miners. This number of workers represents an increase of about 800 families to the Carbon-Emery area. These people will subject local wildlife resources to substantially increased pressures.

Data collected as a result of the Company's environmental monitoring program should be made available to the Division. Air and water quality changes from the plant's operation could affect vegetation which will be critical to wildlife management programs (pages 1-93 through 1-95).

Description of the Environment, Chapter Two

Effects that could result from subsidence are not completely evaluated in the section titled "Geology and Topography"(pages 2-25 through 2-30). No mention of potential loss of water is made in this area. If subsidence alters or eliminates waterflows from springs and seeps, serious adverse impacts on wildlife will occur. Valuable and unique vegetation communities will be lost. Livestock and wildlife will concentrate at any remaining water sources. Wildlife, especially deer and elk, will become serious competitors with livestock for a limited water resource. Ultimately, numbers of wildlife of all species will be reduced by a loss of water. Lowered numbers of game animals would ultimately result in a reduction in recreational opportunity for the public.

Description of the water resource (pages 2-41 to 2-48) illustrates that there are many seeps and springs and two lakes on East Mountain which could be affected through subsidence from mining coal. Many wildlife species rely on these water sources; some on a year-round basis. Wildlife should be considered a primary user of the water resources on East Mountain. A detailed inventory of all seeps, springs, lakes and streams including location and water quality and quantity should be developed and provided for the Statement. This information is available through the U.S. Forest Service. Evaluation of subsidence is incomplete without this base-line data.

The reference on page 2-48 to Duck Lake should be changed to Duck Fork Reservoir. It should be explained, on page 2-50, that Electric Lake is a cutthroat only water. The last paragraph on this page needs to be rewritten as it is poorly done and has some errors:

Cleveland - RBT (fingerlings plus catchables)
Miller's Flat - RBT (fingerlings)
Duck Fork - Not stocked
Willow Lake - RBT (catchables)
Ferron Reservoir - RBT (catchables plus fingerlings)

Additionally, none of the waters discussed hold brooktrout. References on page 2-51 should note that stream fluctuations are primarily a result of releases from the controlling impoundments on Lower Fish Creek, Huntington and Cottonwood Creeks. The major diversions on Huntington and Cottonwood Creeks are well below the canyon mouth, with the usable habitat extending to the point of diversion.

Sediment in Huntington Creek is primarily a result of construction activities in the creek.

Due to the inability of the stream habitat to support spawning activities as a result of siltation caused by dam and bridge construction, the Division has stocked brown fingerlings in Huntington Creek below Electric Lake for the past three years.

Data presented in the Draft indicates rangeland reseedings on disturbed areas at lower elevations will be successful in only three of every 10 years. Acreages along the higher elevations of the transmission lines apparently have greater potential for success for rangeland seedings. The Final Statement should include a tabulation of acreages for each vegetation community under each project component in table 2-7. This information would be extremely valuable in assessing re-vegetation potentials. Losses of wildlife habitat due to construction of a project component may be of significant duration if seeding success is as low as 30 percent.

The terrestial wildlife resource statement that "mule deer, elk, American pronghorn antelope, upland game birds, and waterfowl are the major game species" is inadequate. Cottontail rabbits and snowshoe hare are abundant in the Primary Influence Zone. Almost every component of the project affects one or both of these game species. Cougar and bear are game species inhabiting higher elevations of the project area.

The game habitat map (figure 2-8 page 2-55) is not complete. The map should be enlarged to encompass the Primary Influence Zone along with transmission line corridors and other components of the project. Wildlife habitats on the existing map are incomplete. Deer fawning and elk calving areas are not limited to the small area outlined on this map. Such areas can be identified along the entire length of the Manti.

Upland game habitat on the map appears to be identified only in the agricultural areas that are primarily inhabited by pheasants and doves. Areas used by Utah's two species of forest grouse, quail habitat, sage grouse habitat and, chukar habitat should be indicated.

Waterfowl habitat is poorly labeled on the game habitat map. Huntington Creek provides year-round waterfowl habitat. Desert Lake Waterfowl Management Area is not identified on the map. Waterfowl habitat from Sigurd to Camp Williams has not been identified on this map. Utah Division of Wildlife Resources publication No. 74-17 titled "Evaluation of Existing Wetland Habitat in Utah" provides detailed information on waterfowl habitat.

Cottonatail rabbit and snowshoe hare habitats are not identified. Cougar and bear habitats are not outlined. Furbearers and muskrats are not mentioned or their habitats outlined on the map. During the 1975-76 trapping season, 14 trappers, representing 8 percent of the State's beaver trappers, harvested 132 beaver in the Carbon-Emery area, which equals 6 percent of the State's total beaver harvest by licensed trappers.

Trapping for nonprotected wildlife - muskrats, coyote, fox, bobcat and other animals - is not discussed in the Statement. Two muskrat trappers were issued

permits for the Desert Lake Waterfowl Management Area during the 1975-76 trapping season. These permits sold for a total of $70; about 300 muskrats were harvested. It is unknown how many muskrats were harvested by trappers in the remainder of the Primary Influence Zone.

The discussion of deer and elk on page 2-56 is not complete. The importance of the Manti (deer herd units 32, 33, 34, 35, 36A and 36B) and Book Cliffs (deer herd units 27A and 27B) deer herds is not conveyed. These deer herd units supported 7 percent of Utah's total deer hunting trips and 7.5 percent of the deer harvested in 1975.

For the last two years (1974 and 1975) sales of resident deer hunting licenses have been showing a negative trend. Deer license sales were 4.5 percent less in 1974 than in 1973, and 1975 sales were 2.9 percent below 1974 levels. Concurrent with this statewide decline in deer hunter license sales, a 5.2 percent increase in the number of hunter days spent on the above deer herd units occurred. We believe a significant portion of the increase resulted from the Emery Power project and, further, it is our contention that additional increases in hunting pressure will occur as project activities are expanded.

Manti Mountain units supported 28 percent of the total hunter days by Utah's elk hunters in 1975 and provided 26 percent of the elk harvested that year.

The discussion of antelope on page 2-5 is also incomplete. Only the Icelander Wash antelope herd is identified. The San Rafael antelope herd occupies the Primary Influence Zone.

The upland game bird discussion on page 2-56 is inadequate. Several distinct populations of sage grouse, one on Horn Mountain and others scattered from Emma Park to Scofield Reservoir, have been identified by the Division. The Emery-Spanish Fork-Camp Williams transmission line passes through habitats used during different seasons by sage grouse.

Cottontail rabbits and snowshoe hares are not considered in this Draft Statement. Cottontails are abundant and widely distributed throughout the foothills and lower elevations of the Primary Influence Zone. Snowshoe hares are abundant and distributed throughout the coniferous type on the Manti Mountain. Several components of the project directly affect each of these species.

Statements oriented to waterfowl in Chapter Two of the Draft Statement are incorrect. Year-round use of habitats in the Primary Influence Zone has only been documented on Huntington Creek. All other areas experience a winter period when no marshland avifauna are present. Every water source in the Primary Influence Zone provides for some waterfowl use.

Desert Lake Waterfowl Management Area was not described in the Draft Statement. This Management Area experienced a 20 percent increase in hunter trips and a 19 percent increase in ducks harvested from 1974 to 1975. An additional 107 trips to Desert Lake are expected due to the Emery Plant. This amounts to a 12 percent increase over numbers of hunter trips during the 1975 season. This increase is significant considering the small size of area. Consideration has already been given to alternative management practices to regulate hunting on this area.

The nongame wildlife paragraph is misleading. Predators are listed as coyotes, foxes, bobcats and lions. Many wildlife species, particularly birds, prey upon each other; thus, use of the term "predator" in this limited context is not particularly appropriate. Also, lions are game animals and should be considered in the game section.

The moose release statement (page 2-56) should read " . . . winters of 1973 and 1974 a total of 39 head were released . . . ." The Draft states, " At present, their habitat is limited." That statement is accurate, but it should be noted that habitat is not currently limiting herd size. Desert bighorn sheep should also be included in the uncommon and unique species reference. A bighorn ram was observed by Division employees at the Ferron dump in 1965. Unconfirmed reports of bighorns on the San Rafael occur regularly.

The statement on page 2-57 noting, "There are no species classified as threatened, under the endangered species act, in the project area," is vague if not inaccurate. Peregrine falcons have been sighted in the Primary Influence Zone. A traditional aerie is located along the San Rafael River, and an unidentified falcon was observed within one mile of the aerie in 1976. Knowledge concerning the Peregrine falcon is lacking; a negative declaration is inappropriate.

The statement relates to only 1,700 acres of pheasant habitat in the project area. The generating complex will cause pheasant use and production to change on 2,000 acres of Utah Power and Light land 2.5 miles south of Castle Dale. Another 1,430 acres of land owned by Utah Power and Light outside the generating site will be altered due to cessation of cropland irrigation. The terrain of these areas is flat to generally rolling in nature. Change of use on this 3,430 acres owned by Utah Power and Light represents a loss of both prime and marginal pheasant habitats. Prime habitats consist of 1,831 acres of agricultural (87 percent), riparian (9 percent), and saltgrass (4 percent) covered lands. Marginal pheasant habitat includes 1,599 acres of greasewood (30 percent) and saltbrush (70 percent).

The agricultural land (1,600 acres) taken out of production represents 3.5 percent of the total irrigated agricultural land in Emery County. The 1976 Utah Agricultural Statistics lists 46,295 acres of irrigated cropland in Emery County, Utah. This same figure is listed in their 1975 publication. The Draft Environmental Impact Statement (page 2-44) indicated Emery County has 38,604 acres of irrigated cropland. The figure in the Statement should be corrected.

Numbers of pheasants and quality of habitat in the Castle Dale area are among the best in Emery County. Assuming this cropland is only average, at least 236 hunter-days of recreation will be taken from pheasant hunters each year with a loss of 243 birds harvested. Change in use on lands owned by Utah Power and Light have resulted in 195 breeding hens being displaced from their habitat. Those hens had a potential to produce 885 young annually. These estimates of pheasant losses on lands owned by Utah Power and Light for the Emery Plant should be considered minimum.

Habitats inside and outside the generating complex also produce cottontail rabbits and mourning doves. Neither of these species are adequately described in Chapter Two of the statement.

Dove hunters in Emery County have averaged 2.59 doves bagged per hunter day during the period 1965 through 1975. The average number of doves bagged per hunter day in 1975 was 1.93. During the last six years (1970 through 1975), Emery County has averaged 1.45 percent of Utah's total mourning dove harvest. In 1975, 1.6 percent of the mourning doves harvested in Utah were taken in Emery County.

An increased human population in Emery County will subject the dove population to additional pressures. It is not known how this will affect the dove population.

Cottontail rabbit hunters in the Carbon-Emery area accounted for 16 percent of the State's total hunting pressure on cottontails. They harvested 17 percent of Utah's total cottontail bag. Summer roadside counts show an average of 0.45 cottontails observed per mile in Carbon and Emery Counties during the last nine years. Only 0.23 cottontails per mile have been observed on summer routes the last two years. This is a 49 percent decrease from the long term average. Additional hunting pressure resulting from the Emery Project will impact upon cottontail populations, especially when they are at low points in their population cycles.

The discussion of wildlife (deer) and habitat surrounding the Wilberg Mine (page 2-58) fails to note this habitat supports not only deer, but cottontail rabbits and a wide variety of nongame wildlife species. This section should be rewritten to fully describe the wildlife resource associated with the coal source and support facilities.

The Draft Statement is inadequate in its discussion of wildlife and wildland habitats to be affected by the coal haul road and conveyor (page 2-58) between the mine portal and the plant site. Deer are the only wildlife described along these components of the project. Table 2-8, page 2-40, illustrates that these two project components will remove 50 acres of agricultural land, three acres of riparian land and one acre of saltgrass. This represents 54 acres of productive pheasant habitat in addition to 58 acres of greasewood and saltbrush providing marginal pheasant habitat.

The Draft Statement identifies the 15 acres of pinion-juniper to be removed by haul road and conveyor construction as important deer winter range. Losses of pheasant habitat and use of this habitat by deer (large numbers of deer utilize the agricultural areas in late winter and early spring), pheasants, doves, cottontail rabbits, raptors, and the wide variety of nongame wildlife that populate the area should also be noted.

The description of habitats and the associated wildlife in the areas crossed by the power transmission lines is deficient in description. Additional data should be presented to fully evaluate effects of transmission lines and the construction and maintenance of such lines on all wildlife. Numbers of deer or elk reproductive areas (fawning and calving areas) the transmission lines will cross are not tabulated or their locations identified. Additional data classifying linear miles of wildlife habitat to be disturbed by transmission lines should be provided. This classification should include habitat types, e.g., pinion-juniper, mountainbrush and mixed conifer, together with wildlife use of a specific habitat to permit evaluation of effects from these components. Consideration should also be given to other wildlife species.

Cougar and bear inhabit some of the area to be crossed by the power lines. Sage grouse wintering areas and strutting grounds are crossed by the transmission lines.

Cottontail rabbit and snowshoe hare habitat will be crossed. A Peregrine falcon was sighted on January 12, 1975 by Utah Wildlife Resources biologists in an area adjacent to the proposed power line corridor in Spanish Fork Canyon. Other nongame wildlife utilize areas to be affected by power line corridors.

The Draft Statement indicates that on company owned lands outside the generating complex Utah Power and Light will "retire crop acreage by withholding irrigation water in hope that this action will lower the water table at the generating complex" (pages 2-72 through 2-76). This area is west of the generating plant. The Draft fails to identify additional acreage owned by Utah Power and Light immediately east of the generating complex where this same action will occur (page 2-72). It should be recommended to Utah Power and Light that rangeland reseeding be initiated in all areas where irrigation will be discontinued so some benefit will accrue to upland game. Livestock grazing should also be controlled to preserve habitats for wildlife.

The human resource section does not adequately treat the problem of housing for project families. A shortage of housing facilities has already resulted in a movement of camping trailers into the lower reaches of local canyons. Workers living in these trailers are a threat to wildlife and wildlands. Water pollution by raw sewage and an accumulation of trash along the creeks is of serious concern. Constant and daily disturbance to wildlife species inhabiting these areas will result in degradation of the wildlife resource. This problem currently exists and is directly related to the Emery Plant. Therefore, a notation should be included in the Statement.

The discussion of quality of life in the project area on page 2-88 should point out that people in this area are keenly interested in hunting and fishing. A public opinion survey of Utah residents, proportionally distributed throughout the State, was conducted by the Bureau of Government and Opinion Research at Utah State University in Logan, Utah, during 1974. That survey revealed 91 percent of Utah residents felt that the present level of wildlife habitat should be maintained. The question to increase habitat was not asked, but 4.4 percent volunteered the comment that habitat should be increased. Other data are included in the survey report which note the significance of hunting and fishing to Utah citizens and suggest the role fish and wildlife play in their quality of life.

The projection that refers to the wildlife resource on page 2-98 should indicate known data and trends. From the standpoint of illegal activity alone, we can identify a trend that has and will continue to reduce the quality and quantity of the wildlife resource. Numbers of wildlife citations issued in the Southeastern Region of Utah has increased 180 percent between 1968 and 1975. To demonstrate the current trend in numbers of violations, citations issued during 1974 and 1975 increased 26 and 48 percent over the respective previous year.

The number of wildlife citations issued in the Carbon-Emery area have increased 41 percent from 1973 (105 citations) to 1975 (148 citations). Figures for 1975 are not yet available, but a significant increase in violations is known to have occurred.

Cougar and bear inhabit some of the area to be crossed by the power lines. Sage grouse wintering areas and strutting grounds are crossed by the transmission lines.

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Environmental Impacts of the Proposed Action, Chapter Three

Many of our preceeding comments in reference to Chapter Two included an assessment of environmental impacts. These assessments were presented with our comments on Chapter Two to explain our position and concern. Those previously noted impacts will not be repeated on our review of Chapter Three.

Some of the aquatic habitat discussion on page 3-45 should be modified or strengthened. Length of the average fishing day is calculated at $3\frac{1}{2}$ hours, and a catch rate not to exceed one fish per hour is the Division's standard for success. Based on these figures, the increased human population resulting from the project will create a demand for 28,000 additional fish. The statement leads one to believe there are currently fish being stocked to cover the projected need. We recommend not using the word "catchable" as it implies a hatchery type product. The statement about reducing game fish numbers is incorrect as we will control the numbers of game fish through stocking based on demand.

We are unable to locate any comment in the Statement concerning the adverse effect that reducing the volume of water in Millsite Reservoir will have on that fishery. This is important impact and recognition should be made of it in the Statement.

The statement presented on page 3-47 that "Although the additional number of people in the area would adversely affect the wildlife species and their habitat, the increase would be only a minor increment to the total increases that would occur by 1981 in Carbon and Emery Counties" is misleading. We believe the increase will result in major impacts.

The Statement indicates, on page 3-48, that 100 acres of riparian habitat would be lost through retirement of land inside and outside the generating complex. This is inaccurate. Data in Table 2-8, page 2-40 shows 165 acres.

The acreage of deer habitat and numbers of deer affected by the project shown on pages 3-48 and 3-49 are in error. The Draft Statement reports that only 32 acres of deer habitat would be destroyed through construction of the coal conveyor, coal storage facilities, coal haul road and development at the mine. Table 2-8, page 2-40, shows 47 acres of pinion-juniper alone will be lost. All other habitat identified supports deer; thus, 159 acres and not 32 will be lost from these activities. These figures should be added to the 520 acres affected along the Grimes Wash, and the loss of 55 deer adjusted to equal 68 deer.

The discusiion relating to human disturbances affecting wildlife states that habitat will be lost as a result of increased numbers of people. Another factor which is not evaluated is the direct impact increasing numbers of people have on wildlife; i.e., habitat may not be destroyed, but human disturbances cause displacement of wildlife.

The discussion of subsidence and the potential of drying up springs on East Mountain on page 3-68 fails to recognize wildlife as a major use of those water sources.

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Adverse Impacts Which Cannot Be Avoided Should The Proposal Be Implemented, Chapter Five

All of the comments relating to wildlife in Chapter Five should be altered to reflect comments made earlier.

There is no indication in this chapter that ORV use will adversely affect wildlife.

The Draft Statement constantly refers to effects lasting the life of the Project. Animal behavior and patterns of use by wildlife that are altered or affected for 35-40 years will not be readily overcome. Such impacts may be permanent unless the area was completely restored to its original condition upon abandonment of the project site and facilities.

Irreversible and Irretrievable Effects, Chapter Seven

All statements referencing wildlife should be corrected to reflect our earlier comments.

Alternatives, Chapter Eight

We will not attempt to discuss each of the alternative sites since any one selected would require preparation of a complete Environmental Impact Statement.

Summary of Utah Division of Wildlife Resources Review of the Draft Environmental Statement for the Emery Power Plant

The Draft Statement as it describes the existing wildlife resources and habitats and the effects of the generating complex and its components on those resources is poorly presented. The position is taken that effects from the Emery Plant will represent only a small portion of what the energy industry will bring to the Carbon-Emery area. The Emery Project Environmental Impact Statement should relate specifically to impacts from this project. The population of Carbon and Emery Counties was estimated at 26,000 people (page 2-80) in 1975. The Draft (page 3-70) indicates that 1,165 people are currently residing in the Carbon-Emery area as a result of the Emery Project. This is a 4.5 percent increase over the 1975 population level. The total population added to the Carbon-Emery area due to the Emery Plant will be 4,512 people by 1981. This equals a 17.4 percent increase over the 1975 population due to the Emery Plant alone. We would recognize this as a significant increase.

Realizing that other energy industry will cause about a 6 percent per year increase in population exclusive of the Emery Plant, the Carbon-Emery population will increase 42 percent from 26,000 in 1975 to about 36,881 people in 1981; with this increase, plus the increase from the Emery Plant, the population in 1981 will equal 41,393 people; a 59 percent increase over the 1975 population. The Carbon-Emery area will increase in population with or without the Emery Plant. However, the influence of the Emery Plant alone is significant.

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Environmental Defense Fund

701 Canyon Road, Logan, Utah 84321 (801) 753-3985

COMMENTS ON THE DRAFT ENVIRONMENTAL
IMPACT STATEMENT ON EMERY

Submitted by

Mary Belle Bloch
Southwest Energy Specialist

Introduction

The Environmental Defense Fund (EDF) is a national coalition of scientists, lawyers and other citizens concerned with and working on environmental problems. One of the particular areas of concern and action for EDF has been federal-state supervision of energy development in this region. The Emery D-EIS warrants attention despite UP & L's initiation of building of the complex prior to completion of the EIS process. For this reason, an alternatives chapter is ridiculous. The following comments are not construed to be an exhaustive critique. We have tried to identify major weaknesses, oversights and incorrect statements.

Coal Quality

Appendix I-7 (pp. 1-119 ff.) - Rationale for Average and Worst Grade Coal Analysis to be Used for Emission Rate Source Terms

To consider a coal that is 0.54% sulfur and 11,719 Btu/lb. as an average coal from the Hiawatha Bed is in error. Similarly, to consider a coal with 0.58% sulfur and 11,298 Btu/lb. as worst coal is also in error. Accordingly, the calculations of emissions resulting from the burning of said worst coal quality are inaccurate.

Table I-7-1 shows analysis of coal from mines on the Hiawatha Seam and reports a range of sulfur content of 0.5 - 1.2% with an average of 0.67%; and the range of Btu/lb. of 10,880 - 12,930 with an average of 12,379. Table I-7-2 shows the range of sulfur content in Hiawatha Coal as 0.31% - 1.5% with an average of 0.67% and the range of Btu/lb. as 11,660 - 13,274 with an average of 12,448. On the other hand, Table I-7-3 which shows the coal analysis data for the Hiawatha Bed, Wilberg Mine, that will be supplying the Emery Power Plant shows a range in sulfur content of 0.4% - 0.9% with an average

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of 0.62%. The rationale for determining worst coal was based on Table I-7-6 which also shows that coal received on 9/10/75 had 0.6% sulfur and coal received on 12/26/75 had a Btu/lb. value of 10,446.

In order to realisitically determine emission rates, worst coal should be one with 0.7% sulfur and 10,500 Btu/lb. Such coal would result in much higher emissions than the assumed worst coal (0.58% sulfur and 11,298 Btu). It is unheard of to take a low average sulfur content to start with and add one standard deviation to it to arrive at worst coal quality. It is a known fact that a coal seam is never homogeneous throughout and that there are wide variations in composition both vertically and laterally. It is also interesting to note that a coal with 0.72% sulfur and 10,500 Btu/lb. (which exists in the Hiawatha Seam and the Wilberg Mine according to Tables I-7-2 and I-7-3) would violate the Federal and State emission standard for SO_2 (1.2 lb./million Btu).

Trace Elements in Coal

No analysis of the coal in the Wilberg mine was made for trace elements. To infer that the analysis of coal from the nearby Deseret Mine and other mines in the Hiawatha Seam is comparable to results expected from the Wilberg Mine coal is grossly in error. Wide variations in trace elements in coal seams are the general rule with enrichment near the bottom of a seam and in some cases at the top as well.

Coal Quantity

Eighty-four million tons of coal would be the predicted maximum used during the projected 35-year economic plant life(pp.1-55). The annual consumption range is 1.6 to 2.4 million tons (pp.1-56). In traditional room and pillar operations, 50% of the coal resource can be recovered. It is unrealistic to estimate 70% recovery. The D-EIS states that 70 million tons exist in the Hiawatha bed within the Wilberg mine (pp.1-58, 2-69) for use at the Emery plant. Where is the additional coal resource? Can all the permits be granted for operation of a steam electric plant be given if sufficient coal reserves for the projected life of the plant are not identified? How much coal is expected to be mined out of the Wilberg mine? The calculations as to the specific quantity of coal which will be mined out of the Wilberg mine vary. There are two conflicting statements:

> "There is no practical means by which the subsidence could be mitigated on 4,658 acres of land above the Wilberg mine as an estimated 57 percent of that coal is removed." (pp. 4-11)

"Subsidence may occur on 4,658 acres of land above the Wilberg mine as an estimated 70 percent of the coal is removed." (pp. 5-7)

The Deer Creek mine is listed as an alternate coal source (pp. 8-141, 8-142). What is the estimated reserve in this mine adjacent to the Wilberg Mine? Is this resource presently under lease to UP & L or Peabody? Are there any private leases within this coal lease area? How much of the Deer Creek mine resource would be available for use at the Emery plant?

The quantity of coal available from the alternate sources is unknown. Estimated recoverable coal figures are stated in Figure 8-26 (pp. 8-14). Does any more accurate information exist?

SO_2 Emission Control

We support the position of the Environmental Protection Agency (EPA) as stated in the March 10, 1976 letter from John A. Green to Mr. Verl R. Topham (Appendix VIII-4). To allow UP & L to eliminate scrubbers from the two steam electric units at Emery would significantly increase the SO_2 emission rate. The data presented in the Appendix (VIII-3, VIII-4) should be presented in the main body of the Emery environmental impact statement.

Subsidence

What are the effects of subsidence on the aquatic and terrestrial wildlife in the vicinity of the potential mining areas? Four thousand, six hundred and fifty-eight acres may be directly impacted. "The actual surface area affected by subsidence would extend beyond the coal lease area" (pp. 3-30). In addition, "Subsidence could affect soils, land use, water resources, and human safety" (pp. 3-31). These are insufficient statements as to the impacts of subsidence. Possible effects on the 50 mammal species, 245 bird species, 20 species of fish and 33 species of reptiles and amphibians (pp. 2-56) should be identified. To state that only 552 acres of deer winter range. . . adjacent to the Wilberg mine would be lost (pp. 3-49) is unrealistic since subsidence could directly impact at least 4,658 acres. This section needs to be clarified and the real impacts identified.

Transmission Lines

The treatment of transmission lines throughout the D-EIS is insufficient. A thorough analysis of this system is necessary. How long will the construction of this transmission route take? It is merely stated that, "Preconstruction and construction activity would continue year round, with work proceeding at higher elevations (predominantly National Forest lands) during the summer and at lower elevations (mostly on private and national resource lands) during the cooler months." (pp. I-82)

The alternatives section discusses two modifications of the Spanish Fork - Camp Williams proposed transmission line routes but there is little discussion of the proposals in the Provo area.

What is the specific route through Provo? A proposed route through a city as large as Provo (200,000 by 1980) should be specifically identified. The reader of this D-EIS has only a small scale map (pp. I-80), several profile maps (pp. 2-113, 2-115, 2-117, 3-97), and one paragraph of text (pp. 3-69) available to identify the specific route. UP & L has proposed three routes in the Provo area. How many existing and planned residential homes will be affected along each route? How much acreage will be impacted by each of the routes?

Socioeconomic Factors

Evaluation of socioeconomic data generated by most proposed energy developments is still in the developmental stages. Socioeconomic sections of the Emergy D-EIS are incomplete and incorrect. The following comments highlight some of the major weaknesses of these sections throughout the D-EIS.

What background data exists to support the following? "About 75 percent of the plant operators and miners would probably live in Price and Helper. Most of the remaining 25 percent would probably live in Huntington, Castle Dale, Ferron, and Orangeville." (pp. 3-81) This statement might be correct during the early construction stage, but most workers will favor living closer to their work location as soon as housing is available. It cannot be assumed that future settlement patterns will follow the current pattern. Presently 50% of the construction workers live in Price or Helper with 30 to 40% living in Huntington, Castledale, Ferron and Orangeville (pp. 3-71, 3-72).

How can the percent change in unemployment in Carbon County, Emery County and the state be known for 1976 when we are still in the 1976 calendar year? Figure 3-13 (pp. 3-76) should be revised. What is the source for the data presented in Table 3-15 (pp. 3-78), Projected Income from Emery Power Generating Plant? Also, how is the income multiplier figured for this table?

It is stated that, "Future energy development could bring $2 and $7 million in additional taxes by 1985 to Carbon and Emery Counties, respectively" (pp. 3-78). What is the distribution of these taxes? What proportion of these taxes comes from capital expansion? What are the frontend costs which Emery and Carbon Counties will have to provide? How do the fertility rates used compare with the national average family size of 3.5 persons (Table 3-11, footnote c).

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Energy Conservation

Congress has recently enacted legislation which should be identified in the alternatives section. The Energy Conservation and Production Revenue Act of 1976 was enacted in August 1976.

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OFFICE OF THE DIRECTOR

United States Department of the Interior

BUREAU OF MINES
2401 E STREET, NW.
WASHINGTON, D.C. 20241

September 21, 1976

Memorandum

To: District Manager, Bureau of Land Management, Richfield, Utah

Through: Assistant Secretary--Energy and Minerals

From: Director, Bureau of Mines

Subject: Draft environmental statement, Bureau of Land Management, for Emery Power Project, Emery County, Utah

The Bureau of Mines Intermountain Field Operation Center, has reviewed the draft environmental statement for Emery Power Project, Emery County, Utah, prepared by an inter-agency team from the Bureau of Land Management, Geological Survey, Bureau of Reclamation, and Forest Service. This statement discusses environmental impacts of Utah Power and Light Company's two 430-megawatt, coal-fired, steam-electric generating units now being installed south of Castle Dale in Emery County, Utah, and the associated transmission lines that would cross national resource lands.

Mineral resources are adequately covered in the document. The increase in available power will benefit the growing mineral industry activities in this region.

Director

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80203

Ref: 8W-EE
D-BLM-J07004-UT

OCT 1 1976

Mr. Paul Howard, State Director
Bureau of Land Management
Utah State Office
P.O. Box 11505
Salt Lake City, Utah 84147

Dear Mr. Howard:

The Environmental Protection Agency has reviewed the draft environmental impact statement for the Emery Power Plant in Utah. Before addressing the specific details relating to our review of the impact statement, we would like to express our concern about the actions of Utah Power and Light regarding the Emery project. Completion of the Emery project requires that a number of federal actions be taken that are subject to environmental analysis under the Council on Environmental Quality's Guidelines implementing the National Environmental Policy Act. Proceeding with construction of the project prior to the completion of the required analysis, especially after being requested by the BLM to stop further construction, indicates a lack of environmental concern. In the event that such rights-of-way permits, etc., are ultimately granted, it is appropriate for federal agencies to consider conditioning their permits, etc., to insure that environmental factors are given consideration by UP&L in the future.

Air quality and the applicability of regulations for the Prevention of Significant Deterioration (PSD) is an important consideration for the Emery project. In this regard EPA would like to refer to our letter to UP&L that is contained in the draft EIS on page 8-199. The letter states that it is EPA's determination that the Emery Power Plant is subject to PSD regulations. A number of changes need to be made in the EIS to reflect this fact. Our detailed comments on air quality are attached to this letter and elaborate on some of the necessary changes.

A major shortcoming of the EIS was the inadequate analysis of alternatives to the project. Our comments on this subject are rather lengthy and are also attached to this letter. Our less detailed comments are included below.

A basic issue that should have been more completely analyzed in the EIS is the amount of additional electrical generating capacity that will actually be needed in the UP&L service area in the future, and when it would be necessary to have this generating capacity on-line. UP&L's projected annual growth rate of 9.1-10.4 percent appears to be highly excessive in light of the demonstrated need to conserve our energy

resources. A lower, more reasonable growth rate would not require the urgency presently being expressed by UP&L for the development of electrical generation capacity. EPA recommends that an independent demand study be made for the UP&L service area, and that the results of this study be presented in the final EIS. This independent demand study would also be necessary for evaluating future projects proposed by UP&L.

Considering the amount of development proposed for this part of Utah, there appears to be a critical lack of planning in several areas. One of these being off-road vehicle (ORV) use, and this is an area where adequate planning by federal land management agencies is important. The impact statement indicated that no planning has been done for the anticipated increase in ORV use. EPA believes it is important that such planning be accomplished as soon as possible. Off-road vehicles could cause considerable resource damage that could greatly increase erosion, and the visual impact of ORV use in the San Rafael Swell area could be considerable.

The failure to adequately analyze the impacts of the proposed Emery-Spanish Fork-Camp Williams transmission line as it passes the Provo area is a major omission in the impact statement. A transmission corridor through an urban area could have significant impact, and the impact should be adequately analyzed. EPA recommends that the analysis for transmission lines should include a complete discussion of possible effects upon health (physiological and psychological) caused by extended exposure to high-level electric fields. This discussion should include the results of the latest research conducted in this area. The expected impact to radio and television reception for residents near transmission lines should also be included in the analysis.

In accordance with the policy of EPA to categorize the nature of our comments, we are assigning these comments an ER-2 designation. Briefly, this signifies that we have reservations concerning the environmental effects of the proposed project and that additional information is needed in the EIS to fully evaluate environmental impacts.

Thank you for providing EPA the opportunity to comment on this draft impact statement. Please send us five copies of the final EIS when it is available.

Sincerely yours,

John A. Green

John A. Green
Regional Administrator

Enclosure

EPA's Comments on Air Quality and Project Alternatives
For the Emery Draft EIS

AIR QUALITY

The State of Utah issued a new source construction permit for the Emery plant on December 12, 1973, based on a plant design that would provide for 80% removal of sulfur dioxide in accordance with the then existing Utah air pollution control regulations. On July 9, 1975, these regulations were amended to delete 80% sulfur dioxide removal and require best control technology that was reasonable and practicable. Subsequently, the applicant, UP&L, proposed to eliminate the scrubbers from its original plant design. Based on EPA's finding that the elimination of scrubbers would be a significant modification to the originally approved design plan and that such alteration would occur after the June 1, 1975, date set out in 40 CRF Section 52.21, it is EPA's determination that the Emery plant would be subject to PSD regulations if UP&L formally requests and receives approval from the state to delete the scrubbers.

The following comments address discrepancies in the EIS regarding air quality:

The text on page 2-18 does not agree with Table 2-3 regarding particulates. The table shows no violations of the 24-hour ambient standards while the text indicates 16 violations of the primary standard and 51 violations of the secondary standard.

On page 2-22, the daily concentrations of particulates around Emery need to be presented. Monthly concentrations are unrelated to national standards.

Page 3-11. Table 3-1 gives emission rates and emission standards. Table 3-2 gives NAAQS. Table 3-1 is not referred to in the text, and Table 3-2 is wrongly referred to.

Page 3-14. Table 3-3 should be 2.5 m/sec for wind speed.

Page 3-15. The "d" footnote is placed only on particulate estimates, but refers to SO_2 and particulates. The 71 tons/day SO_2 emission rate is less than either 83 tons/day for average grade coal, or 92 tons/day for worst grade coal. If the 71 tons/day emission rate is increased for short-term dispersion estimates to 92 tons/day, the VTN estimate of 1000 ug/m^3 becomes 1310 ug/m^3, which is above the 3-hour standard. BLM estimates would be changed from 928 ug/m^3 to 1215 ug/m^3, which is very close to the standard. The particulate emission rate given in Table 3-4 is not consistent with Table 3-1 either.

If the source does not put SO2 control on, then the most restrictive standards will be based on PSD regulations, and the percentages quoted in the last column of Table 3-4 are incorrect. They are also incorrect if the 71 tons/day emission rate was used to make the estimates.

Table 3-4 does not agree with the text on page 3-16 regarding the maximum 24-hour concentrations of SO2. The table, which is referenced in other sections of the statement, needs to be corrected.

Page 3-16. The highest predicted 3-hour concentrations determined by C9M3D for interaction with elevated terrain were scaled to 24-hour estimates. The model is set up to give 24-hour estimates initially, and if any scaling were to be done, it would be from 24-hour to 3-hour; unless the model was modified to give 3-hour estimates. If it was modified, an explanation should be given.

Page 4-11. In the section on Climate and Air Quality, the statement is made that no practical means exists by which to mitigate the addition of air pollutants, including SO2, NOx, particulates, trace elements, etc. The EIS should clarify how the determination was made that controlling SO2 was not practical, because other utility companies are planning SO2 control on their facilities.

Page 5-4. If the emission rates quoted here are applied to the results in Table 3-4, which are based on a lower emission rate, the conclusions may be different.

Page 8-8. The second sentence of the last paragraph is not stated correctly. The 80% control is not required by PSD. However, if the facility is constructed not to include 80% control, as the permit to construct specified, then PSD will apply.

Page 8-129. The footnotes at the bottom of Table 8-25 indicate that the same diffusion model was used by NAWC, VTN, and BLM, and the difference in concentration estimates results from different assumed source terms. However, in other parts of the EIS it appears that BLM used the EPA C9M3D Valley Model, and VTN and NAWC did not use this model. This inconsistency needs to be clarified. Also, in Table 8-25 the three diffusion modeling results show that the source would be in compliance with the National Ambient Air Quality Standards. However, it is not clear which emissions rates (71 tons/day, 83 tons/day, or 92 tons/day) were used. As pointed out in the comments above, referring to page 3-15, compliance with the 3-hour standard would be marginal. All three results show that the Class II PSD increments would be exceeded.

ALTERNATIVES TO PROPOSAL

General Considerations

A recent FEA-funded study showed that one-half of the energy consumed in the United States is wasted. Such energy waste certainly indicates that there are numerous practical alternatives to building ever increasing numbers of power plants, which traditionally have a substantial impact on the environment. The Emery draft EIS did not adequately analyze alternatives to the Emery power plant. The major deficiencies are discussed below.

Energy Conservation

The EIS did not discuss the federal government's ongoing efforts to implement the Energy Policy and Conservation Act (EPCA) of 1975. Based on the requirements of EPCA, the federal government is in the process of implementing the following programs:

1. Development of State Energy Conservation Programs -- This program includes the promulgation of detailed guidelines for state conservation plans, preparation of specific energy conservation goals for each state, and authorization of $50 million for grants to states for the preparation of conservation plans.

2. Industrial Energy Efficiency Improvement Targets -- This program directs FEA to develop a program to promote increased energy efficiency by the American industry and to establish voluntary energy efficiency improvement targets for at least the ten most energy consumptive industries. Each corporation in an industry for which a conservation target has been established is required to report to FEA not later than January 1, 1977, and annually thereafter, on the progress which such corporation has made in improving its energy efficiency.

3. Appliance Labeling Requirements and Efficiency Standards -- Under this program, the Federal Trade Commission is required to prescribe rules for labeling household appliances to show their energy efficiencies and estimated annual operation cost. EPCA also directs FEA to prescribe energy efficiency improvement targets for these appliances and to promulgate mandatory standards if the Administrator of FEA determines that reasonable energy conservation measures are not being implemented.

4. Development of a Conservation Program for the Federal Government -- EPCA directs the President to develop and implement a ten-year plan for energy conservation with respect to buildings owned or leased by the federal government. The plan should at least include mandatory lighting efficiency standards; mandatory thermal efficiency and insulation standards; and restrictions on hours of operation, thermostat controls, and other conditions of operation.

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In addition to ongoing conservation efforts at the federal level, some states are independently pursuing energy conservation programs. California is a notable example, and the actions it is taking could easily be duplicated in the UP&L service area. California's Energy Resources Conservation and Development Commission (ERCDC) has promulgated the following mandatory conservation measures:

- o Insulation, weather stripping, and glazing standards for new residential buildings.
- o Banning of electric resistive heating in new commercial buildings after 1977, unless it can be shown to be cost-justified on a life cycle basis.
- o Mandatory energy efficiency standards for residential appliances.
- o Glazing and lighting standards for commercial buildings.

In addition to the regulatory actions already instigated by ERCDC, the Commission currently is in the process of planning or considering additional conservation measures which would also potentially reduce electricity demands in California.

The Public Utilities Commission in California has recently instituted a new lifeline rate structure for gas and electricity. This new rate structure provides lifeline quantities of electricity at a basic cost to supply the minimum energy needs of the average residential user for space and water heating, lighting, cooking, and food refrigeration. Additional uses of energy for extra lighting, televisions, air conditioning, etc., would be charged at a higher rate. A rate system such as this is helpful to the person living on a fixed income, and it encourages conservation of scarce energy resources by penalizing the wastefulness of large users. The widespread adoption of lifeline rate structures for utilities could substantially reduce demand by curbing extravagant uses of energy.

Peak-Load Pricing, Load Management and Reduced Reliability Levels

The EIS did not consider the potential impact of peak-load pricing or load management on the demand for generating capacity. Such an omission is significant since experience in Europe over the last ten years has shown that peak-load pricing can motivate consumers to change their consumption patterns. While the European experience is not directly applicable to the U.S., preliminary results from an FEA-sponsored study in Vermont show that certain peak-load pricing incentives caused residential consumers to shift their peak electricity use from mid-morning

to late evening, thereby reducing the overall peak demand for the system. 1/ Also, preliminary results from an ongoing 1-million-dollar peak-load pricing study by the Electric Power Research Institute (EPRI) show that a 10 percent increase in the price of electricity during peak hours may result in a 2 to 3 percent decline in peak demand. The EPRI study is expected to produce final results by the end of the year on the cost, feasibility, and potential impact of peak-load pricing.

The EIS did not address the cost or feasibility of delaying the need for the Emery plant by accepting a lower level of reliability. However, a recent study on the economics of alternative levels of reliability for electric power generation 2/ concludes that the present one-day-in-ten-years loss of load probability criterion is too conservative and the consumer in the U.S. is probably incurring costs many times greater than the value of the electricity produced from the incremental kilowatt of capacity. The study also concludes that it would be possible for the U.S. to reduce the reliability target levels to a five-day-in-ten-year criterion without seriously affecting the quality service as perceived by most consumers. This conclusion is supported by data that shows that only a handful of loss of load incidents reported under FPC order 331-1 have been a result of insufficient generating capacity, as contrasted to distribution or transmission system failures. It is also important to point out that, according to the previously-mentioned article, the U.S. seems to have had the highest electric service reliability experience (i.e., lowest experience of loss of load) in the world.

Solar Energy

The discussion in the EIS on solar energy needs to be expanded considerably, and it should reflect the current status of research and development programs and the existing availability of solar energy hardware. The EIS is misleading in indicating that harnessing solar energy is strictly in an experimental stage and that widespread utilization would not be practical in the near future.

Heating hot water electrically for domestic use represents a significant portion of the load on a power plant. However, hot water heaters utilizing solar energy have been commercially available for decades, and the widespread use of these solar water heaters could considerably reduce the demand for electricity.

1/ Green Mountain Power Corporation, "Preliminary Progress Report" for the Federal Energy Administration, December 1975.

2/ Michael L. Telson, "The Economics of Alternative Levels of Reliability for Electric Power Generation Systems." The Bell Journal of economics.

The EIS implies inaccurately that the use of solar energy for space heating and cooling is only in the experimental stage. The manufactured hardware for solar space heating and cooling is available commercially from a number of companies. A rapidly growing number of residences, commercial buildings, and schools are being built to utilize solar energy on a non-experimental basis. Utilizing solar energy for space heating and cooling in all new construction would substantially reduce the demand for additional electrical generating capacity.

Steam-cycle conversion plants for large-scale electricity generation are in the research and development stage. However, a prototype plant is being constructed in Albuquerque, New Mexico, and industry researchers working under government contract feel that the technology exists for commercial use of such plants, and at a competitive price.

EPA recommends that BLM contact a variety of leaders in the solar energy field (those who are engaged in R&D work and those who are manufacturing and selling solar products) to obtain the necessary information to adequately analyze the alternative of utilizing solar energy.

Combinations of Alternatives

The most practical alternative to increased generating capacity is probably a combination of several alternatives. Conservation, solar energy utilization, load management, reduced reliability levels, etc., all practiced together could drastically reduce the need for new generating capacity.

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Advisory Council on
Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

October 4, 1976

Mr. Gary F. George
Acting District Manager
Richfield District Office
Bureau of Land Management
P. O. Box 768
Richfield, Utah 84701

Dear Mr. George:

This is in response to your request of August 6, 1976 for comments on the draft environmental statement (DES) for the Emery Power Plant, Emery County, Utah. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969 the Advisory Council on Historic Preservation has determined that this DES demonstrates compliance with Section 106 of the National Historic Preservation Act of 1966, prior to amendment on September 28, 1976 (PL 94-422), but that it is inadequate because it does not demonstrate compliance with the provisions of Executive Order 11593, "Protection and Enhancement of the Cultural Environment" of May 13, 1971, with regard to this proposed undertaking.

As part of its planning process the Bureau of Land Management (BLM) should arrange to have the areas to be impacted by the proposed undertaking surveyed to identify cultural properties eligible for inclusion in the National Register of Historic Places pursuant to Executive Order 11593, "Protection and Enhancement of the Cultural Environment" of May 13, 1971 and Section 106 as amended, in accordance with the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800). After the survey is complete the BLM should consult the Utah State Historic Preservation Officer to determine whether any property included in or eligible for inclusion in the National Register will be affected by the proposed undertaking. If such a propery will be affected and the project cannot be redesigned to avoid that effect, then the BLM is required to afford the Council an opportunity to comment on the undertaking in accordance with the "Procedures".

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.

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Subsequently, the final environmental statement prepared for the undertaking should assess its impact on extant historic and cultural resources. If any of these properties are eligible for inclusion in the National Register the environmental documentation should demonstrate contact with the Council pursuant to the steps detailed in the "Procedures" and include a copy of the Council's comments.

Should you have any questions or require any additional assistance, please contact Brit Allan Storey of the Council's Denver staff at P. O. Box 25085, Denver, Colorado 80225, telephone number (FTS) 234-4946.

Sincerely yours,

Louis S. Wall
Assistant Director, Office
of Review and Compliance

cc:

Dr. Clement M. Silvestro-Chairman, ACHP
Mr. Milton L. Weilenmann-Utah SHPO
Ms. Marilyn Klein-Council on Environmental Quality

39

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
324 25th Street
Ogden, Utah 84401

8420

October 4, 1976

Mr. Paul L. Howard
State Director
Bureau of Land Management
136 East South Temple
Salt Lake City, Utah 84111

Dear Mr. Howard:

We apologize for the delay in responding with comments to your draft environmental statement of the Emery Power Plant.

We requested the Fishlake, Manti-LaSal, and Uinta National Forests, as well as our Regional Energy Development Officer, to review and comment on the statement.

The Manti-LaSal Forest is responding directly to you, as per our telephone conversation with Dale Torgerson on October 1. A copy of the Uinta Forest Supervisor's comments is enclosed.

Please consider the following comments:

Pg. 1-65-6 Coal Transportation System
Propose to fence haul road by 42" fence w/36" woven wire and 2 barbed on top.

Comment - Deer crossing will be very difficult over fence. Drop use of 32" woven wire (at least on N.F.) and substitute barbed wire. Bottom wire should be 16" from ground level.

Pg. 1-70-b. Coal Conveyor - (2) Description
It is very questionable that deer will cross under the conveyor when it is running. The conveyor makes so much noise that they will probably be frightened away. The present conveyor which runs from Deer Creek Mine to the Huntington Plant does not show that deer are passing under. We suggest tests be made or a literature search be made to determine what type of crossing will work.

Pg. 1-95- (Monitoring Program - Water Quality Monitoring)
Comment - Water Quality Monitoring by UP&L (or Peabody) should be required at Grimes Wash below Wilberg Mine.

Pg. 2-75 - Table 2-13 Land Use & Ownership
This table is not accurate. Under Coal Source, footnote b says,

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"The surface area above the mine is 4,658 acres of Forest Service land only." This is an incorrect figure. Approximately 2,080 surface acres are owned by 3 private owners above the Wilberg Coal Lease and the balance by F.S.

Pg. 3-30 D-Geology and Topography
1) Move site.

Suggest this section be redone.

Analysis of impacts as follows should be included:
A. Impact of subsidence on private and N.F. land
1. Water - springs decreasing or disappearing.
2. Uses such as grazing and wildlife decreasing.
3. Remuneration to private and N.F. for loss of value of capital improvements - fences, water developments, revegetation projects, summer home sites.
4. Utah P&L 345 kV transmission line is located directly over an area that is estimated to drop 4 to 10 feet. Line may have to be relocated.
5. Several National Forest grazing permittees who used the area prior to the establishment of coal leases may be put out of business if springs disappear and land becomes unsafe to use.
6. Accelerated erosion may occur depending on severity of subsidence.

Sincerely,

P.M. Rees

P.M. Rees
Director, Regional Planning
and Budget

Enclosure

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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Uinta NF

REPLY TO: 8420 Other Agencies Environmental Statements — September 14, 1976

SUBJECT: Draft Environmental Statement on the Emery Power Plant and Transmission Lines

TO: Regional Forester

We have reviewed the Draft Statement for the proposed Emery powerplant and transmission lines as it relates to the Uinta. Our comments will be confined to the Spanish Fork Canyon-Camp Williams transmission line.

Utah Power and Light presently has two 138 KV lines and one 46 KV line going through Spanish Fork Canyon. They plan to construct a 345 KV line in their present proposal and, according to our most recent information, they have plans for another 345 KV line in the canyon by 1990. In addition, a 138 KV line is proposed down Diamond Fork and Spanish Fork Canyon within the next 5 years from the Central Utah Project power generating facilities. ICPA also has indicated a need to transmit power through the Spanish Fork corridor from the proposed IPP plant.

Based on the information presently available, we find the impacts of multiple powerlines in the canyon environmentally unacceptable.

We recommend the proposed action not be approved. Instead, we tend to support the general direction of the alternative listed as the first modification in the Draft Statement in Chapter 8, Alternatives To The Proposed Action. The design consideration we favor could be a double circuit 345 KV alternating current line or another design that would reduce future impacts by consolidating lines to the extent feasible. Such an approach would eliminate the three existing powerlines and provide one new support structure for them in addition to proposed powerlines for Emery and other sources.

Specific comments concerning the Draft Statement are enclosed.

DON T. NEBEKER
Forest Supervisor

Enclosure

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SPECIFIC COMMENTS ON EMERY DRAFT ENVIRONMENTAL STATEMENT
Uinta National Forest

Chapter 1

Section D.8, pages, 1-78 to 1-85. This section describes access and construction activities for the transmission lines. It implies that no new access roads would be constructed on the National Forest in Spanish Fork Canyon. We hope this would be the case; but, in referencing the proposed line location, this does not appear realistic. The equipment listed in Table I-II does not include a helicopter which would be necessary to erect towers on steep areas with no present access. This is particularly important in the canyon below Diamond Fork.

We are confused by this section of the proposal and feel it should be clarified. Construction activities and access should be more accurately described as they relate to National Forest land. There will be tower sites in lower Spanish Fork Canyon that will require helicopter installation.

Chapter 2

Section B. Figure 2-24, Page 2-68. This photograph is shown as a typical scene in the Spanish Fork Canyon corridor, but it was probably taken in Salina Canyon. This isn't significant, but we thought we would point out the discrepancy.

Appendix II, pages 2-113, 2-127, 2-129, 2-131. That portion of the Spanish Fork Canyon that falls within the boundaries of the Uinta National Forest has been inventoried and classified under the Forest Service Visual Management System. This system identifies the canyon as highly sensitive, while the Bureau of Land Management system used indicates medium sensitivity. The Forest Service system shows the transmission line crossing areas that have been classified as Retention, Partial Retention, and Modification. The BLM system does not show the landscape classifications. The majority of the most sensitive landscape affected (areas of Retention classification) is between Diamond Fork and the Spanish Fork substation. This is the most critical part of the line from the visual resource standpoint. The Retention visual quality objective requires all management activities to be subordinate to the characteristic landscape and, in general, means man's activities are not evident to the casual Forest visitor.

Chapter 3

Figure 3-5, page 3-60, showing critical points of contrast. That area indicating skyline over low-growing vegetation should be expanded to include the area from the mouth of Spanish Fork Canyon to Billie's Mountain. Along the rest of the line on National Forest land, careful

tower placement can avoid the skyline.

Chapter 8

Section J, Page 8-161. This section of the Statement states that long-term plans indicate a need for three additional 345 KV lines through Spanish Fork Canyon are likely by 1990. These are for:

1. Wheeling Power for IPP
2. Huntington Units 3 and 4
3. Emery Units 3 and 4

In discussing Utah Power and Light's future plans with company officials, they have indicated to us that they foresee only one additional line being necessary down Spanish Fork Canyon. We feel this situation should be clarified and information obtained from the company, in writing, as to what their future plans really are for transmitting power down this corridor.

We also question the need for a 345 KV line for each of the above-mentioned units. According to the information we have received, one 345 KV line will transmit 780 megawatts. If each plant is designed to produce 430 megawatts, there would be 3,400 megawatts produced in this area. Including the present proposal, there are five 345 KV lines existing or planned from the Emery-Huntington area--two down Salina Canyon; one over the Manti top; one to the Four Corners region; and one down Spanish Fork Canyon. These five 345 KV lines should be able to transmit this power and have some additional capacity. If this information is correct, why would three additional lines be necessary?

It is also stated that these three additional lines could be converted into a 500 KV line. Is this possible to do and still transmit the same amount of power carried in three 345 KV lines?

We feel that future plans, needs, and line carrying capacities need to be expanded and evaluated in much more detail to allow sufficient information for comment.

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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Manti-LaSal National Forest
350 East Main Street
Price, Utah 84501

8420
(2720)
October 18, 1976

Bureau of Land Management
850 North Main Street
Richfield, Utah 84701

Gentlemen:

We appreciate the opportunity to comment on the Draft Environmental Statement for the Emery Power Plant. Most of our questions and concerns were given consideration prior to the release of the DES. We wish, however, to make one other comment.

The effects of subsidence on lands above the Wilberg Mine are relatively unknown. It is not necessary to speculate on impacts associated with subsidence until further data is available. We have enclosed information written for a recent coal lease readjustment for your consideration. We think that this is a good approach to the subsidence problem and associated impacts. We also recommend that an inventory-monitoring program be initiated in conjunction with the U.S. Geological Survey to determine subsidence impacts and possible mitigation measures. Guidelines concerning these studies are contained in the May 17, 1976, Coal Mining Operating Regulations, Federal Register, Volume 41, No. 96. We do not feel that feasible mitigation measures can be recommended until impacts are known.

If you have any questions regarding our comments, please contact our office. Thanks again for the opportunity to participate in the Emery project.

Sincerely,

Reed C Christensen
REED C. CHRISTENSEN
Forest Supervisor

Enclosure

IV. Summary of Probable Adverse Environmental Impacts Which Cannot be Avoided (Residual Impacts)

Subsidence of the land surface is a major factor in coal mining activities and in the future use of the land surface above mine workings. The magnitude and effects subsidence will have upon these activities and uses are not fully understood. It is known that subsidence does occur over mined out coal seams, and that several factors influence the rate and extent to which it will occur. Of these, the mining method, thickness of the coal seam, and the depth and lithology of the overburden materials are the most significant.

Four mining methods can be anticipated to be employed, depending upon conditions and nature of the coal seams. These methods include conventional, continuous room and pillar, longwall, and shortwall.

In both conventional and continuous room and pillar mining, part of the coal bed is left as pillars to support the overburden. These pillars are not removed until the mine boundaries have been reached. For this reason, significant subsidence in most cases cannot occur or begin to occur until the pillars are removed late in the mine life. Subsidence has been known to occur where room and pillar mining was used and pillars were not removed. Here, however, overburden materials were thin and weak and unlike that in the lease area.

Shortwall and longwall mining both are continuous full extraction methods and the overlying strata are permitted or induced to cave as mining of each given segment is completed, in order to reduce pressures on the coal seam. Subsidence, using these mining methods, would occur as the mining progresses. It is, however, difficult to predict the time involved in which the land surface might subside, as this is dependent upon the thickness and lithology of the overlying materials which are variable from mine to mine.

The longwall and shortwall mining methods are preferred over room and pillar methods for both economic and environmental reasons. Long and shortwall mining, under proper conditions, are the more economical methods of removing a higher percent of the coal, which better utilizes the natural resource.

Impact to the surface from subsidence may be substantially less from longwall mining than from convential methods. Continuous removal of the coal allows the overlying strata to bend rather than fracture. Observation has shown that this is generally less disruptive to the land surface and to natural ground water flow.

It is expected that a combination of these mining methods will be used as the mine conditions permit to obtain maximum coal extraction, and maintain required safety practices. Estimates are that from 40 percent to 70 percent of the coal will be removed.

Two seams of coal having a combined thickness of about 15 feet are to be mined on the lease areas. A rule of thumb used by many to estimate the amount of subsidence which might occur is; subsidence of as much as 50 percent of the combined thicknesses of the coal seams removed can be expected at the ground surface. Some authorities predict that under certain conditions, subsidence could be as much as 70 percent in a particular mine. This, however, does not indicate the time-period involved and assumes full extraction of the coal seams, and the percent subsidence would be proportionally less with a lesser percent of coal removal.

The depth from the surface to the coal varies, but it will be in a range from 300 to 2,000 feet. This depth will influence the amount of subsidence at the surface as broken rock occupies a larger volume of space than unbroken rock. Fractures associated with the caving will propagate upward until the void left by coal removal is filled with broken rock. The amount of rock above the seam that will be fractured depends upon the depth of the seams, the volume of coal removed, and the nature of the overburden.

The nature or the lithology of the materials overlying the coal can have a great effect upon the amount and rate of subsidence, and also upon the method of mining and of coal recovery.

Curved like a bow, zones of compressive stress called compression arches, tend to occur above and below the mine panels and transfer the overburden load in coal extraction areas to adjacent solid coal boundaries or barrier pillars. The caving and flexure of strata in the distressed zone encompassed by the arches into the mine cavities tend to increase the stresses again in the mine workings. Flexure of strata also produces tensile and compressive stresses within lithologic units and shear stresses across lithologic boundaries. As time goes by, the mine voids are widened, the compression arches migrate higher in the overlying strata and eventually may reach the surface. This migration continues to transfer overburden stresses back into the extraction area from the mine boundaries or barriers. The rate of migration of compression arches, and consequently the rate of stress transfer, depends on thickness and strength of overburden strata, duration and rate of mining, mine geometry, and mining sequence.

Subsidence of the land surface should be expected in varying degrees over the lease area from very little to, perhaps, several feet in some areas. The effects of subsidence are expected to be similar to those observed at other mines in the vicinity. It is expected that subsidence will be gradual and, in most cases, will begin to some degree at the onset of the mining and will continue beyond the life time of the mining.

Subsidence effects have been casually observed at several locations. Only casual observations were made as measured data are unavailable which have evaluated the magnitude and effect of the subsidence.

Most features observed are subtle and include small slumps on steep slopes, slight depressions, and some tipping of trees and shrubs. Drainage patterns did not appear significantly changed or erosion increased. From casual observation, the present land use did not appear to be affected or changed significantly.

There were no observed features developed from mine subsidence that pose possible hazards to human or animal life, or are deleterious to present land uses.

The effect subsidence had upon the natural ground water flow system in areas which have subsidence could not be determined by observation and is, therefore, unknown. This would require a monitor and inventory program established prior to mining. It is expected, however, that mining and subsidence will have some significant effect upon the natural ground water flow. Interception of water courses by mining and fracturing of aquifers by subsidence may alter flow patterns, increase recharge, and change spring flows.

40

IX. Management Requirements and Constraints

The effects and the impacts of subsidence over removed coal beds are dependent upon many factors, and in most areas not fully understood. The mining method, thickness of coal seams, depth and lithology of the overburden materials are possibly the most significant factors which influence the magnitude of subsidence. Past experience has shown that subsidence does occur with impacts upon surface resources varying from insignificant to high.

In order that the magnitude of the subsidence at the ground surface can be evaluated, a monitor-inventory program is required. This program should be developed in conjunction with the U.S.G.S. and should be continued until the necessary information is obtained. Areas of investigation should include changes of topography, underground and surface hydrology, and effects on vegetation.

Guidelines to effect these studies are contained in May 17, 1976, "Coal Mining Operating Regulations," Federal Register, Vol. 41, No. 96.

APPENDICES

A

APPENDIX I

CORRESPONDENCE RELATING TO EMERY PROPOSAL

I-1. Letter From State of Utah Division of Health to UP&L, December 12, 1973 (Authorization to Construct Emery Generating Complex)

CALVIN L. RAMPTON
Governor

STATE OF UTAH—DEPARTMENT OF SOCIAL SERVICES

PAUL S. ROSE
Executive Director

DIVISION OF HEALTH
44 MEDICAL DRIVE
SALT LAKE CITY, UTAH 84113
AREA CODE 801
328-6108

Board of Health
Air Conservation Committee
Health Facilities Council
Medical Examiner Committee
Nursing Home Advisory Council
Water Pollution Committee

LYMAN J. OLSEN, M.D., M.P.H.
Director of Health

December 12, 1973

BUREAU OF ENVIRONMENTAL HEALTH
72 East 4th South
Salt Lake City, Utah

Mr. J. C. Conder
Director Power Plant
Engineering and Construction
Utah Power & Light Company
P.O. Box 899
Salt Lake City, Utah 84110

Dear Mr. Conder:

Evaluation of plans, specifications and other information pertaining to two 415 MW coal-fired steam electric generating units proposed for construction in Castle Valley, Emery County, Utah has been completed.

A public hearing regarding the proposal was duly advertized and conducted December 4, 1973.

Utah Power & Light Company is hereby authorized to construct a coal-fired steam electric generation plant in Castle Valley, Emery County, Utah as proposed in Volume I of two volumes titled:

NORTH EMERY GENERATING STATION
APPLICANT'S ENVIRONMENTAL ANALYSIS
Utah Power and Light Company
October 1973

Sincerely,

Grant S. Winn

Grant S. Winn, Ph.D.
Executive Secretary
Utah Air Conservation Committee

CAN:il

cc: Board of County Commissioners, Emery County
Southeastern District Health Dept.

I-2. Inclosure to Letter From UP&L to BLM, October 14, 1975 (Site Selection Process)

SITE SELECTION PROCESSES AND CHOICE OF THE EMERY SITE

In 1972 the sites which appeared most feasible for new coal fired steam electric units were Huntington, Lincoln Point, Little Mountain, Naughton, Emery (East or West), and Garfield. Other sites of lesser rank were also undergoing screening.

In August of 1972, Bechtel Power Corporation was employed to screen the above list of primary sites for feasibility and costs. Two nuclear sites were also studied. North American Weather Consultants were also retained to make preliminary studies of the potential for air quality impact at these and other sites.

The Bechtel Study included the following factors:

General Meteorology	Site Suitability
Engineering Geology	Topography
Foundations	Access
Drainage	Fuel Delivery
Seismicity	Water Delivery

The preliminary meteorological study by North American Weather Consultants considered the following factors:

Site Selection
Page Two
October 14, 1975

Terrain Effects	NOAA-EPA Model Predictions
Relative Elevation	Proximity to Population
Terrain Roughness	Proximity to Other Sources
Stagnation Potential	

Also, at that time (August 1972) it was determined that detailed environmental studies should be carried out on the Emery and Naughton Sites. All environmental studies indicated that the Emery Site and transmission routes chosen are appropriate for the purpose intended and that the environmental impact will be at a minimum practical level.

In regard to the selection of Emery rather than other alternatives for earliest development, expansion at Huntington would be less expensive initially unless such expansion necessitated addition of SO_2 removal equipment. However, because of air quality considerations and questions concerning accuracy of available meteorological modeling, a decision was made that Huntington should be limited to two units until air monitoring demonstrated additional units could be installed without violation of present and probable future air quality standards. Also, the Emery East Site was chosen as compared to the Emery West Site for air quality improvement.

The Emery East Site had the following principal advantages and disadvantages with respect to the <u>other</u> alternatives considered:

Advantages:

1. Meteorological studies indicated the air quality in the vicinity of the plant was better compared to all other major alternatives (considering existing and possible future air pollution sources).

2. Lowest cost (based on equivalent pollution control equipment on all plants).

3. Less transmission environmental impact as compared with Garfield, because of distance to load centers.

4. Remote from National parks as compared to Garfield.

5. Remote from large population centers where air quality impact would be additive to other industrial and automobile air pollution levels existing and potential, as compared with Lincoln Point, Cedar Valley, or Little Mountain.

6. Remote from large Four Comers, Kaiparowits and Navajo Plants as compared to Garfield.

7. It appeared Emery would have enthusiastic support from the vast majority of people living in the area.

8. Probably Garfield Site development delay because of coal acquisition problems.

Site Selection
Page Four
October 14, 1975

9. There was apparent support from "environmentalists" as compared with certain other possible sites.

10. Better availability of operating manpower compared to Naughton.

11. A longer construction schedule at Naughton because of adverse weather conditions.

12. Projected construction manpower shortages at Naughton because of very large industrial construction programs in that state.

Disadvantages:

1. Considerably greater transmission environmental impact as compared to Little Mountain or Cedar Valley.

2. Overlapping construction at Huntington will stress community service facilities such as water and sewer, more than would be the case at Cedar Valley or Little Mountain.

Because of projected load growth, it was apparent that whether Emery or Naughton was chosen as the preferred site to meet the initial operating date of 1978, the other would soon follow. Therefore, the transmission environmental advantage at Naughton or the slight air quality advantage at Emery would be short-lived. On balance, however, the Emery Site was superior and, therefore, chosen for first development.

The Company's Environmental Analysis was completed and submitted to appropriate Government Agencies in October 1973. The Utah Department of Public Health issued a permit for construction on the Emery Plant on December 12, 1973, after public hearing. Special Public Information Meetings were held in Castle Dale and Salt Lake City, Utah on May 22 and 23, 1974.

Construction commenced in the spring of 1975 to meet in-service date of 1978 for the first unit and 1980 for the second.

I-3. Letter From BLM to State of Utah Air Conservation Committee, March 4, 1976 (Emission Controls)

1792.0270-E

Environmental Project Staff
146 North Main, P.O. Box 767
Richfield, Utah 84701

March 4, 1976

Dr. Grant S. Winn
Executive Secretary
Air Conservation Committee
44 Medical Drive
Salt Lake City, Utah 84113

Dear Dr. Winn:

The Richfield District Environmental Project Staff of the Bureau of Land Management is presently completing the Draft Environmental Impact Statement on the Emery Power Plant. To help us in our analysis of impacts we would like to know the present status of the project in terms of sulfur dioxide, nitrogen oxide, and particulate emission controls that would be required and be enforced by the State of Utah.

We appreciate the help and cooperation that your Air Quality Section has given us in the past and we are looking forward to the same relationship as we proceed with the Emery Impact Statement.

Sincerely yours,

Lynn G. Leishman
Acting Project Manager

WWagerner:ebk

I-4. Letter From State of Utah Division of Health to BLM, April 1, 1975 (Emission Controls)

CALVIN L. RAMPTON
Governor

STATE OF UTAH–DEPARTMENT OF SOCIAL SERVICES

PAUL S. ROSE
Executive Director

DIVISION OF HEALTH
44 MEDICAL DRIVE
SALT LAKE CITY, UTAH 84113
AREA CODE 801

533-6108

Board of Health
Air Conservation Committee
Health Facilities Council
Medical Examiner Committee
Nursing Home Advisory Council
Water Pollution Committee

LYMAN J. OLSEN, M.D., M.P.H.
Director of Health

Environmental Health Services Branch
72 East 4th South
Salt Lake City, Utah

April 1, 1976

Mr. Lynn G. Leishman
Acting Project Manager
U.S. Dept. of the Interior
Environmental Project Staff
146 North Main
P.O. Box 767
Richfield, Utah 84701

Dear Mr. Leishman:

In answer to your inquiry concerning emissions constrols required by the State for the Utah Power and Light Company's Emery Plant, the following information is provided: Section 1.3 and 1.7, Utah Air Conservation Regulations (copy enclosed) require that, in all areas of the State, Air pollution control equipment must be selected and operated to afford the highest efficiencies and lowest discharge rates that are reasonable and practicable. In other words, those regulations require that best available control technology, as determined by the Utah Air Conservation Committee, be employed in controlling emissions. These regulations would be applicable to the Emery Power Plant.

Section 2.3, Utah Air Conservation Regulations require 85% control of particulate emissions (based on maximum operating capacity while control devices are not operating); however, this regulation is subject to the further restrictions which may be imposed by Sections 1.3, 1.7 and 2.2, Air Conservation Regulations (Section 2.2 ACR prohibits visible emissions from any new source from exceeding a Ringelmann #1 or 20% equivalent opacity).

The State Implementation Plan originally included a regulation which required new sources to reduce SO_2 emissions by 80%. With the advent of the energy crisis, it became apparent that low sulfur Utah coal could be and was shipped to other states where it could be burned without the use of SO_2 removal equipment (this practice was acceptable in every state except Utah). After thoroughly investigating the situation, the Utah Air Conservation Committee concluded the 80% SO_2 removal requirement, in many cases, placed Utah industry in an unnecessary and unfair competitive position; consequently, as of July of last year, this regulation was rescinded, being superceded by Sections 1.3 and 1.7. Since construction on the second unit at Huntington and the two units at Emery had already begun, these were illegally still subject to the 80% requirement.

page 2
Lynn G. Leishman
4/1/76

After a reviewing all available evidence, including the monitoring results for over a year at the Huntington first unit, the Committee took the following action:

"At this time, flue gas desulfurization units (scrubbers) are not required for the Utah Power and Light Company's Huntington #1 and Emery #1& #2 coal-fired steam electrical generators. The Executive Secretary is instructed to again review the plans submitted for these units in light of this action and include conditions to the construction permit to require:

1. Sufficient space shall be provided at the construction of each unit to allow flu gas desulfurization or other devices or processes should their use become necessary.

2. The sulfur content of the coal used in these units shall not exceed a weekly average of 0.6%; the average including a minimum of one sample per day.

3. The company shall be required to conduct continuous stack sampling for SO_2.

4. Adequate ambient monitoring as determined by the Executive Secretary, Utah Air Conservation Committee must be conducted. This shall include biological monitoring and a minimum of three ambient air monitoring stations at locations around the Emery site; one station to be operated by the State.

5. All data shall be submitted to the State on an agreed upon schedule."

Sincerely,

Grant S. Winn

Grant S. Winn, Ph.D., Director
Bureau of Air Quality

BCB:il

enclosure

I-5. Letter From Utah State Director, BLM, to UP&L, May 30, 1975 (Requirement for Environmental Statement)

IN REPLY REFER TO

1792 (U-911)

United States Department of the Interior

RECEIVED
JUN - 2 1975
BLM Price, Utah

BUREAU OF LAND MANAGEMENT
Utah State Office
Post Office Box No. 11505
Salt Lake City, Utah 84111

Route	Div.	Initial

Action..............

MAY 30 1975

Mr. E. Allan Hunter
President
Utah Power and Light Company
P.O. Box 899
Salt Lake City, Utah 84110

Dear Mr. Hunter:

My staff is progressing with preparation of the environmental impact statement for your proposed Emery Generating Complex. Meanwhile, I have become aware of your construction activities on private property at the proposed generating site. Through the Price District Manager, I also am aware of your arrangements with Emery County officials to build a haul road on national resource lands.

Certainly, we have no authority over your activities on private property. We do, however, have authority to allow or disallow your proposed application for use of national resource lands. We must comply with the National Environmental Policy Act by preparing the environmental impact statement before we reach a decision on those proposed project components on national resource lands. This decision could, in fact, influence your activities on private property.

I believe that your activities being accomplished concurrent with our efforts to prepare the environmental impact statement will subject Utah Power and Light Company and the Bureau of Land Management to severe public criticism.

The above facts have been discussed in detail with the Regional Solicitor in Salt Lake City who advises that advance construction activities may result in an environmental impact statement which does not meet requirements of the National Environmental Policy Act. Based upon this advice, I am urging you to cease all construction activities on the proposed Emery project at this time.

If Utah Power and Light believes it cannot cease operations, BLM must reconsider whether work should continue on the environmental impact statement based on the present project description, which includes alternate plant site locations.

Sincerely yours,

State Director

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

I-6. Letter From UP&L to Utah State Director, BLM, June 9, 1975 (Alternatives to Proposed Emery Plant and Associated Transmission System)

UTAH STATE OFFICE

	CH	Date
	SD	PLH 6/9
	ASD	
	PO	
	DCS	
	ASO	
	FA	
	TcS	

Action:
Info:
Discuss:

UTAH POWER & LIGHT COMPANY
1407 WEST NORTH TEMPLE STREET
P. O. BOX 899
SALT LAKE CITY, UTAH 84110
801-350-3422

F. N. DAVIS
VICE PRESIDENT
ENGINEERING AND CONSTRUCTION

June 9, 1975

Mr. Paul L. Howard, State Director
United States Department of the Interior
Bureau of Land Management
Utah State Office
P. O. Box 11505
Salt Lake City, Utah 84111

Reference: Alternatives to the Proposed Emery Plant and Associated Transmission System
Your Reference - 1792 (U-911)

Dear Mr. Howard:

With reference to your letter to Mr. Hunter of May 30, 1975, and as discussed in your office on June 4, 1975, the following outlines presently existing alternatives to the proposed 830 mw Emery Plant.

All appropriate alternatives to the proposed action (including alternative sites) have been presented in the Applicant's Environmental Analysis of October 1973 and also in the independent study by VTN Associates, performed under contract to the Bureau of Land Management. However, at the present time, (June 1975) converting from the proposed action to any of the alternatives will require the delay of the first generating unit addition beyond 1978.

At the time the Company submitted the first Environmental Analysis, several alternatives were presented. These were the result of a preliminary screening of some twenty-one sites in studies by Bechtel Power Corporation, North American Weather Consultants, and Utah Power & Light Company. Seven plant alternatives were presented in the Applicant's Environmental Analysis, of which five plants were direct substitutes for the proposed

Mr. Paul L. Howard
Alternatives to Emery
June 9, 1975 - Page Two

Emery Station. Two were nuclear alternatives which were not applicable to meet 1978-80 requirements. Several alternative transmission line routes from the Huntington-Emery Area were presented, and these were analyzed by the Forest Service and Bureau of Land Management in conjunction with the Huntington Environmental Statement.

If the Emery Environmental Statement could have been completed in early summer 1974 as was originally believed to be feasible, a switch could have been made to one of several alternatives without serious delay in the in-service date of the first unit, which, as stated in the Applicant's Analysis, required construction to begin in 1975 to meet anticipated load demands. A commitment of resources had to be made on probable sites or there would be a definite risk, and eventually the certainty, of not meeting projected demands as explained in the Applicant's Environmental Analysis. The Company's Analysis indicates the Emery Site to be preferable. As such, detailed engineering was started in 1974 on the Emery Site. In addition, engineering was started on the Naughton Site in order to meet an in-service date of 1979, the next expansion. (The Naughton Units were recently delayed to 1982 and 1984 due to a change in Idaho Power Company requirements and engineering work has been held up.)

Construction was started in the spring of 1975 at the Emery Site in order to meet the in-service requirement of June 1978. Commitment of studies, engineering, land purchase, and construction at any site involves the risk that some expenditures committed might not be beneficial if a particular alternative is delayed or cancelled. The Company believes that the Emery Site is a most feasible site in every respect and will be developed in the near future, and, as such, believes there is a high probability that present expenditures will, in fact, be beneficial. The State of Utah has issued a permit for construction. The Company commenced construction believing this action was necessary to carry out its public service responsibility.

Parallel engineering and initial construction phases for all the generating station alternatives could not feasibly be performed in order to maintain these alternatives for a 1978 in-service date for the first unit. Therefore, at this time all alternatives, other than the Company's proposal, must involve an in-service delay, the extent of which depends upon the alternative chosen. Except for plant delays, the viability of alternatives for the location of transmission lines has not changed from those given in the Applicant's Environmental Analysis.

Mr. Paul L. Howard
Alternatives to Emery
June 9, 1975 - Page Three

It should be understood that the delay of this generating capacity would have severe consequences. Certain new or increased loads for customers, such as thirty-one preference customers, large irrigation customers, coal suppliers, Kennecott, Anaconda, and others could not be served until such capacity could be made available, thus curtailing development of the area's resources.

The alternatives to locating a plant at the Emery Site remain as outlined in the VTN Draft:

1. No Action - The action of failing to produce the additional power required by the growing population and development of the Company's service area would require curtailment of electric service. For details see Applicant's Environmental Analysis or appropriate portion of the study by VTN Associates.

2. Purchase Power - As stated in previous analyses, surveys of neighboring systems reveal no source of purchase power for the time period in question. It should be noted that the 830 mw proposed will inevitably have to be produced in some time frame, which again provides an environmental impact at some site inside or outside the Company's System.

3. Add Units at the Naughton Plant Site - An Environmental Protection Agency Permit and Public Service Commission Permit are in hand for additional units at Naughton. This alternative could be developed with perhaps less loss of time than other alternatives because of the advanced stage of Environmental Statements and engineering. Government right of way for transmission lines must still be obtained at this site.

4. Add Units at the Huntington Plant Site - Air quality considerations favor postponement of additional units at this site until enough air quality monitoring data are available to make unquestioned accurate estimates of the probable added impacts. If air quality considerations prove favorable, additional units will be proposed for Huntington, whether or not the Emery Site is developed.

Mr. Paul L. Howard
Alternatives to Emery
June 9, 1975 - Page Four

5. Develop Other Alternative such as Little Mountain, Cedar Valley, Garfield, or Richfield - For any of the other alternatives, except, perhaps, Little Mountain, it seems likely that Federal permits would be required for some phase of the development, probably requiring detailed engineering and environmental studies and preparation of additional environmental statements.

Although such sites mentioned in 3, 4, and 5 above remain as alternatives, extensive in-service delays would be experienced. Still, the alternatives remain, accepting the adverse electric service consequences. In June 1975, alternatives for transmission lines remain essentially those given in the Applicant's Environmental Analysis. Alternative transmission routes for the Emery Site should not delay service.

In summary, the alternatives for the plant remain, recognizing the effects of choosing another plant site are most serious at this point in time. Commencing construction at Emery does not increase or decrease the viability of other sites as alternatives. Holding up engineering and construction at Emery would only insure that Emery as well as other alternatives would not be available when needed in 1978. The transmission line alternatives remain as described in previous statements.

Very truly yours,

FND/s

I-7. Letter From State of Utah Division of Public Utilities to Utah State Director, BLM, October 7, 1976 (Demand for Electricity)

STATE OF UTAH

DIVISION OF PUBLIC UTILITIES
330 East Fourth South St., Salt Lake City, Utah 84111
533-5513

EUGENE S. LAMBERT
Executive Director
Department of Business Regulation

JOSEPH C. VINCENT
Mgr Accounts & Finance
RAY L. PRUETT
Service Engineer
CLAYTON S. HOGSTROM
Rate Engineer
DONALD K. HALES
Mgr. Regulated Carrier Section

October 7, 1976

Mr. Paul L. Howard
Utah State Director
Bureau of Land Management
U. S. Department of the Interior
University Club Bldg.
136 East South Temple
Salt Lake City, Utah 84111

Dear Sir:

I have now read both the Draft Environmental Statement for the Emery County plant and Dr. Claron E. Nelson's letter to you concerning this same subject. I would now make the following comments.

I must agree with Dr. Nelson when he says that there is very little in the way of economic justification contained in the Draft Environmental Statement. However, this is the way it should be if I understand what a Draft Environmental Statement is supposed to be. It is my judgment that the economic justification has already been established in Case 7140, held November 5 and 6, 1975 before the Utah Public Service Commission. In those hearings, the economic justification for the Emery County plant was discussed and decided. The outcome of those hearings was that it was ruled economically justified and permission was then granted to Utah Power & Light to proceed with the construction of the Emery County plant in so far as this Commission's jurisdiction would allow. It is my opinion that this phase of the matter has already been resolved. It is therefore appropriate that the Draft Environmental Statement does not go into economic justification of this project.

There are a various number of groups attempting to design computer models for the Demand For Electricity. In general, these groups use as a starting point the Utah Process Alternative Future put out by the State Planning Coordinator's Office. Until that computer program is perfected, I am afraid the method of forecasting electrical demands presently used is the best we have. Even so, Dr. Nelson's accusation that there has been no study of electrical demand is just plain wrong. Again I have to disagree with Dr. Nelson and state that is my opinion that this matter has already been looked into in Public Service hearings, Case No. 7140 and the Draft Environmental Statement is not the place to rehash these problems.

I will also agree with Dr. Nelson that costs (dollars per Kwh) will probably be higher for the Emery County plant than the present system average. I do not agree, however, that existing local customers are subsidizing the out-of-state market. There was a problem with tariff sales for resale (Schedules RS-1, RS-2, and RS-3) but a recent decision by the FPC has negated that problem. Tariff sales for resale are no longer being subsidized by the general Utah ratepayer.

The main problem facing Utah Power & Light is not sales outside the system but the increase in population within the State. Most people within the State of Utah are anxious for Utah to grow. Most people want industry to move into the State and create more jobs. There is even a branch of State government designed to promote industry to move into Utah in order to promote growth. However, more jobs means more people and both new industry and new people place upon Utah Power & Light a new demand for firm power. It is this increase that is the prime reason for the need of additional generating capacity. Coupled with this is the growth of the Colorado River Storage projects preference customers. These are typically towns such as Logan, Provo, etc. As these communities run out of power from the CRSP, they are turning to Utah Power & Light to purchase their additional power. The ICPA contract is an example of this problem. These however are Utah citizens and I cannot see an argument for not selling them power if the RS rates are just and reasonable. I therefore have trouble understanding Dr. Nelson's arguments concerning Section 101 of the N.E.P.A.

At the time of the Utah Public Service Commission hearings, a ruling was not made on any environmental issues such as the advisability of one method of coal delivery over another. That was beyond the scope of the hearings held by the Utah Public Service Commission. It is my understanding that this type of question is exactly what the Draft Environmental Statement is looking into. As our Division does not have the necessary expertise to investigate this type of question, we are not planning to take a position one way or another on environmental questions.

In summary then, it is my opinion that the main concern of the Draft Environmental Statement is for environmental issues such as choosing a plant site that will do the least environmental damage and not the economic justification of the plant per se. As Dr. Nelson's objections do not go to environmental issues, but are concerned mainly with economic issues, I must conclude that Dr. Nelson's objections concerning the Draft Environmental Statement are without merit.

Yours truly,

Clayton S. Hogstrom

CSH:kch

Clayton S. Hogstrom
Rate Engineer

cc: Dr. Claron E. Nelson
Mr. Eugene Lambert

I-8. Letters From State of Utah Department of Development Services to BLM, June 22, 1976 and January 27, 1977 (Historical-Cultural Resources)

STATE OF UTAH
Calvin L. Rampton, Governor
DEPARTMENT OF
DEVELOPMENT SERVICES
Milton L. Weilenmann,
Executive Director
420 State Capitol
Salt Lake City, Utah 84114
Telephone: (801)
533-5961

June 22, 1976

Mr. Paul Howard
State Director
Bureau of Land Management
163 East South Temple
Salt Lake City, Utah 84111

Dear Mr. Howard:

Re: Emery Environmental Statement

Staff to the State Historic Preservation Officer have reviewed the material submitted in connection with the above project and concur in the Bureau of Land Management's determination that there are no known National Register historic or cultural resources. The staff notes that the probability of sites has not been established by the Bureau of Land Management.

However, the State Archeologist makes the following observations: 1) that there is no discussion of the archeological potential of any alternatives to the present plans, 2) that the predictions offered in connection with the transmission corridor are not based on actual field work in the given area and, therefore, may not constitute an adequate survey of the area. The staff to the State Historic Preservation Officer reserve further comment until the environmental statement is submitted for formal review.

Sincerely,

DEPARTMENT OF DEVELOPMENT SERVICES

Milton L. Weilenmann
Executive Director
and
State Historic Preservation Officer

MLW:clw

STATE OF UTAH
Scott M. Matheson, Governor
DEPARTMENT OF
DEVELOPMENT SERVICES
Michael T. Miller
Executive Director
104 State Capitol
Salt Lake City, Utah 84114
Telephone: (801) 533-5961

January 27, 1977

Mr. Paul Howard, State Director
Bureau of Land Management
163 East South Temple
Salt Lake City, UT 84111

Dear Mr. Howard

RE: EMERY POWER PLANT

On the basis of staff review, the State Historic Preservation Officer has determined that historical and archeological survey information has not been provided in written form for the area of the proposed project. However, verbal assurances from the Bureau of Land Management staff indicates a proper survey for the archeological resources has been conducted and a written report from Dr. Dale Berge is expected within two weeks. The Bureau of Land Management has assured the staff of on-going monitoring of the project to protect important sites. The survey of historical and cultural resources appears inadequate.

On the basis of BLM assurances of necessary mitigating action on such sites, approval is given for the project.

Sincerely,

DEPARTMENT OF DEVELOPMENT SERVICES

Michael T. Miller
Executive Director
and
State Historic Preservation Officer

JMH:jjw

I-9. Letter From UP&L to Regional Administrator, EPA, February 4, 1976 (Applicability of Prevention of Significant Deterioration Regulations)

UTAH POWER & LIGHT COMPANY

P. O. BOX 899

SALT LAKE CITY, UTAH 84110

LEGAL OFFICES
SIDNEY G. BAUCOM
SENIOR VICE PRESIDENT
AND
GENERAL COUNSEL

ROBERT GORDON
350-3214

THOMAS W. FORSGREN
350-3213

VERL R. TOPHAM
350-3650

SAM F. CHAMBERLAIN
350-3825

ROSEMARY RICHARDSON
350-3796

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CORRESPONDENCE CONTROL

February 4, 1976

Mr. John Green
Regional Administrator
Environmental Protection Agency
Region 8
1860 Lincoln Street
Denver, Colorado

Dear Mr. Green:

Utah Power & Light Company presently has under construction in the state of Utah three steam electric generating units identified as the Second Unit at Huntington and the First and Second Units at Emery. On-site construction of the Huntington unit commenced on March 4, 1974, and on-site construction of the two Emery units commenced on or about April 29, 1975. The construction contracts covering on-site construction work were executed and became effective on April 19, 1974, in the case of the Huntington Unit and on February 27, 1975, for the Emery units.

Prior to commencement of construction at these sites, new source construction permits were obtained from the Utah Air Conservation Committee as required by the statutes and regulations in the state of Utah. Approval for the Huntington unit was issued on August 6, 1973, and approval for the two Emery units was issued on December 12, 1973. These permits were based upon plans submitted by the Company which included a scrubber on each unit designed to remove 80% of the sulphur dioxide from the flue gasses, in accordance with the then existing Utah air conservation regulations. Those Utah regulations were amended on July 9, 1975. The Utah Air Conservation Committee has determined that under the new Section 1.7 of the State regulations the cost-benefit relationships are not sufficient to require the installation and operation of the sulphur removal equipment at this time.

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That determination is, however, subject to the important conditions that adequate space be left for scrubbers should they be needed later, that the Company utilize coal with a maximum sulphur content of 0.6 percent, and that monitoring be maintained so that the State may impose additional controls if it determines they are needed.

Accordingly, the Company is preparing its submission of a formal application to the Air Conservation Committee for approval of plans and specifications deleting the sulphur removal equipment on each of the three units under construction named above.

It is the Company's position, for the reasons set forth below, that, assuming arguendo their validity, the Environmental Protection Agency's regulations for the prevention of significant air quality deterioration do not apply to any of the three units and that the State's determination to delete the sulphur removal equipment in accordance with its regulations does not constitute a "modification" that would make the significant deterioration regulations applicable. However, in order that the Company may proceed with its plans both expeditiously and with full knowledge of the EPA's position, we respectfully request a ruling on the matter.

The three named units are not covered by the significant deterioration regulations because:

1. Construction "commenced" prior to June 1, 1975.

2. "Commenced" is defined in the regulations to mean that the operator has undertaken a "continuous program of construction or modification."

3. The pertinent provisions of Subpart 3(VII)(d)(1), Paragraph 52.21 of the December 5, 1974, regulations as modified by the Administrator's "minor clarifications and corrections" are consistent with the regulation's definitions of construction, commencement and modification. Thus, the "Review of new sources" therein provided applies to a source which has not commenced construction or (expanded) modification prior to June 1, 1975.

Before we proceed to elaborate on these points, we think it useful to put the matter in perspective, for the fact is that the application of the significant deterioration regulations to the specific situation raised here is quite unique to the three units herein described.

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These units are the only ones within the state of Utah that were under construction but not in operation as of June 1, 1975.

The question arises only because of the previous regulation of the state of Utah which was more stringent than required by federal law and the subsequent changes to those regulations to allow operation of plants without sulphur removal equipment where adequate showing has been made that it is reasonable and practicable to do so. Moreover, the Utah Air Conservation Committee has found that such operation of the three units now being constructed by Utah Power & Light Company is reasonable and practicable because of the size and location of the facilities and is based further upon the condition imposed by the Committee that the coal burned in these units not exceed 0.6% sulphur content.

These conditions are specifically in harmony with the national policy to encourage the use of low sulphur coal as a desirable fuel for the generation of electrical energy. It is, we believe, highly significant that any oil or gas fired generation plant in the country could have been modified to utilize this low sulphur coal without sulphur oxide removal equipment being required by these regulations. Its fuel switching action would have been praised as being in the national interest. We strongly believe that the citizens of the state of Utah should be allowed to develop and use this important resource for their own benefit without the imposition of an additional costly requirement by a strained and overly technical interpretation of the significant deterioration regulations which were never intended to apply to this type of situation.

Turning now to the Company's position that the significant deterioration regulations do not apply to the three units named above:

1. The regulations for the prevention of significant air quality deterioration promulgated on December 5, 1974, state: "These regulations will be effective January 6, 1975, and will be applicable to sources commencing construction on or after June 1, 1975."

Since construction had commenced on all three of the herein mentioned generating units prior to June 1, 1975, the significant deterioration regulations are not applicable to such sources.

2. The regulations definition of "commenced" makes it clear that new construction and modification are not synonymous, but mutually exclusive. Thus, the definition speaks of "a continuous program of construction <u>or</u> modification." The

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Company has unquestionably undertaken a "continuous program of construction" of three new generating facilities and not the "modification" of existing facilities.

The three units were not "existing" in December, 1974, when the significant deterioration regulations were promulgated. And construction had commenced prior to June 1, 1975.

3. Deletion of the scrubbers from three units under a "continuous program of construction" prior to June 1, 1975, does not constitute a "modification" or transform a new, unfinished source into a "modified source" under the significant deterioration regulations.

"Modification" or "modified source" is a term defined in the regulations promulgated on December 5, 1974, as follows:

> "The phrases 'modification' or 'modified source' mean any physical change in, or change in the method of operation of, a stationary source which increases the emission rate of any pollutant for which a national standard has been promulgated under Part 50 of this chapter or which results in the emission of any such pollutant not previously emitted, except that . . . ."

No "physical change" or "change in the method of operation" has occurred because these plants are not yet in operation. The only effect of the state agency's ruling will be to delete portions of the approved plans. Any change which might take place would not and could not increase the emission rate since no emission rate has been established and no emission has yet occurred. It seems abundantly clear that the significant deterioration regulations were meant to apply only to sources which "commenced" construction after June 1, 1975, or undertook a modification program which would modify an operating facility and result in a new or expanded source of pollution. It is equally clear that the regulations contemplate the completion of those facilities under construction prior to June 1, 1975, without subjecting such facilities to the regulations. A contrary interpretation could have the effect of rendering such facilities inoperable and result in confiscation of the properties being constructed in violation of the fifth amendment to the Constitution of the United States.

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4. The Administrator's "minor amendments" of June 12, 1975, did not -- and, indeed, could not lawfully -- expand either the scope or applicability of the significant deterioration regulations promulgated on December 5, 1974.

Subpart 3(vii)(d)(1) of Part 52.21 as published on December 5, 1974, provided:

> "(d) Review of new sources. This paragraph applies to any new or modified stationary source of a type identified below which will be located in any State listed in Subpart B through DDD of this part, which source has not commenced construction or expansion prior to June 1, 1975. A source which is modified, but does not increase the amount of a pollutant other than sulfur oxides or particulate matter, or is modified to utilize an alternative fuel, or higher sulfur content fuel shall not be subject to this paragraph."

On June 12, 1975, the paragraph was amended to provide, in pertinent part, as follows:

> ". . . the requirements of this paragraph apply to any new or modified stationary source of the type identified below which has not commenced construction or modification prior to June 1, 1975. A source which is modified but does not increase the amount of sulfur oxides or particulate matter emitted or is modified to utilize an alternative fuel or higher sulfur content fuel should not be subject to this paragraph."

The Administrator stated very clearly, in the preamble to the June 12, 1975, promulgation that the explicit purpose of clarifying the language of paragraph (d)(1) was to correct an "error in the wording" and that "these changes correct minor drafting errors and no change in the scope of the regulations is intended." (40 Fed. Reg. 25005, June 12, 1975, emphasis supplied).

That indeed must be the case, for the amendments became effective immediately without having first been proposed. The Administrator believed such a procedure to be appropriate because, as he stated:

> "1. The modifications are generally minor clarifications and corrections.
>
> 2. The only changes which modify the intent of the December 5 regulations involve minor procedural changes and therefore add no major substantive requirements." Ibid.

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For the Administrator to take a contrary view at this juncture would only serve to nullify the amendments for failure to provide notice and opportunity to comment.

For all of the reasons set forth above, Utah Power & Light Company submits that the significant deterioration regulations do not apply to its three units which are not yet in operation and that were under construction prior to June 1, 1975. We ask that the EPA so rule, and that we be advised at an early date of its ruling in order that the Company may proceed accordingly. In the interim, the Company does not intend to order sulphur oxide removal equipment for either of the units under construction at Emery, pending resolution of this matter, and therefore anticipates a response at your earliest convenience.

We will be happy to furnish any additional information which may be helpful.

Respectfully submitted

VERL R. TOPHAM

VRT:sw

I-10. Letter From Regional Administrator, EPA, to UP&L, March 10, 1976 (Applicability of Prevention of Significant Deterioration Regulations)

Ref: 8E-EL

Mr. Verl R. Topham
Utah Power and Light Company
P.O. Box 899
Salt Lake City, Utah 84110

Dear Mr. Topham:

We have reviewed your recently submitted letter concerning proposed plans for three steam electric generating units in Utah (Huntington #2 and Emery #1 and #2) and the request for determination on the applicability of 40 CFR Section 52.21 contained therein. It is the determination of this Agency that the proposal to eliminate scrubbers from the described units would constitute a modification within the scope of the Federal regulations pertaining to prevention of significant deterioration. Consequently, such modification would subject the three generating units to the requirements of 40 CFR Section 52.21.

Our conclusion is premised upon the finding that the elimination of scrubbers is a significant alteration to the originally approved design plan and that such alteration occurred after the June 1, 1975, date specified in the Federal regulations. The alteration clearly fulfills the criteria set out in the definition of modification, 40 CFR Section 52.01 (d), in that it constitutes a physical and operational change resulting in a substantial increase of the SO_2 emission rate over the original base.

Procedurally, you should submit your application for authority to modify, along with all supporting documents to this Office: attention Mr. Lou Johnson. If the information provided in the application is sufficient, we are required to afford opportunity for public comment on our analyses of the modification's effect on available ambient air increment.

If you have further questions regarding this matter, please feel free to contact Ms. Christine Phillips, Chief, General Enforcement Section, at (303) 837-2361.

Sincerely yours,

(Original signed by John A. Green)

John A. Green
Regional Administrator

cc: Dr. Grant S. Winn
Chief
Air Quality Section
Bureau of Environmental Health
44 Medical Drive
Salt Lake City, Utah 84113

bc: Lou Johnson

CPHILLIPS
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APPENDIX II

FEDERAL, STATE, AND LOCAL CONTROLS AND PLANS

County and Community Comprehensive Plans

The local comprehensive plan outlines the physical development of a community. It includes studies of land use, circulation, public facilities and services, as well as the citizens' own goals and policies for future development. The local comprehensive plan reflects the citizens' views of how they would like their community to develop. The plan projects future land use, density, future streets and highways, parking, and projected future public facilities and services. In some cases, it outlines costs.

The local comprehensive plan acts as a guide to the local planning commission and county commission for zoning and subdivision changes. It has no legal authority; however, the courts have ruled that changes contrary to the comprehensive plan must be justified by the one seeking the change.

Local Zoning and Subdivision

The two primary local instruments for land-use regulation are zoning ordinances and subdivision regulations. With very few exceptions, these two legal devices are enactments of local governments. The two usually work hand in hand to assure orderly and controlled development.

Zoning

Jurisdictional areas are divided into zoning districts. Regulations are uniform throughout each zoning district but differ with the zoning type. Control is exercised by specifying minimum and maximum limits as to height, size, and placement. In addition, permission, prohibition, or agreement may be required.

Zoning is intended to:

- -lessen congestion (streets, playgrounds, open spaces)
- -secure safety (provision against fire, panic, floods, etc.)
- -promote health (moral or general welfare)
- -provide adequate light and air
- -prevent overcrowding of land and buildings
- -avoid undue concentrations of population

Realization of the above intents depends on the support given by local officials and vigorous enforcement of the ordinances.

Subdivision

Subdivision is the act of separating land into smaller parcels for resale, often as home or commercial sites, and the practice is regulated by local ordinance. The local governments utilize the subdivision ordinance to assure a rational pattern of streets as well as new area development. Controls are applied through specification or approval. Items usually considered include street alignment and width, water supply, sewerage, drainage, roadway design and construction, grading plans, and lot size and configuration.

BLM Management Framework Plan

The Bureau of Land Management has developed the Management Framework Plan into a decision document based on an analysis of resources within a given unit. This analysis results in a set of resource recommendations for optimizing multiple-use resource management.

BLM's San Rafael Plan

The Bureau of Land Management has prepared a preliminary multiple-use management plan for the area known as the San Rafael Swell. This area has generated considerable public concern and has a high potential for grazing, wilderness, oil and gas development, coal mining, uranium mining, and recreation.

U.S.F.S. Land Use Plans

The major planning system within the U.S. Forest Service is their land use planning system. These plans are structured to identify, measure, evaluate, and coordinate overlapping and interdependent ecological, social and economic systems. Above all, the land use plans are "Multiple Use Management Plans": requiring the management of all the resources within the National Forests so that they are utilized in a combination which will best meet the needs of all individuals. Resources within the National Forests include wood, minerals, water, soil, forage, wildlife, fish and recreation. The "Land Use Plan" is the overall guide for managing a particular geographic area within the National Forest so as to reflect the most desirable combination of uses without destroying any of the resources. The plan provides guidance and direction for the preparation of various Functional Plans and reflects management goals and objectives.

Federal, State and Local Controls and Plans

Plan	Government Entity	Current Status
Comprehensive Plan	Carbon and Emery counties	Prepared in 1971
Comprehensive Plan-Price River Valley Municipalities	Castle Gate, Helper, Price, and and Wellington	Prepared in 1971
Comprehensive Plan - Emery Municipalities.	Emery, Orangeville, Cleveland, Castle Dale, Green River, Huntington, Ferron, and Elmo.	Completed in 1972
Zoning	Carbon County	Prepared in 1973
	Emery County	Prepared in 1970
	Price	Prepared in 1959
	Helper	Prepared in 1959
	Green River	Prepared in 1960
	Huntington	Prepared in 1974
	Orangeville	Prepared in 1975
	Castle Dale	Prepared in 1974
	Ferron	Prepared in 1974
	Emery	Prepared in 1974
	Wellington	To be prepared in 1975
	Cleveland	To be prepared in 1975
	Clawson	Not prepared (no plans)
	Sunnyside	Not prepared (no plans)
	East Carbon City	Not prepared (will be in 1976)
Subdivision	Carbon County	Prepared in 1972
	Emery County	Prepared in 1970
	Price	Prepared in 1956
	Helper	Prepared in 1975
	East Carbon City	Prepared in 1969
	Huntington	Prepared in 1974
	Orangeville	Prepared in 1975
	Ferron	Prepared in 1974
	Cleveland	To be prepared in 1975
	Green River	To be prepared in 1977
	Wellington	To be prepared in 1977
	Clawson	Will not be prepared
	Emery	Will not be prepared
	Castle Dale	To be prepared in 1977
Advisory Committee	Southeastern Utah Association of Governments	To be prepared in 1975
Management Framework Plans	Bureau of Land Management	Summerville - 1968
		Robbers Roost - 1970
		Price River - 1971
		Muddy - 1972
		Sinbad - 1972
		Wattis - 1973
		San Rafael - 1973
		Range Creek - 1974
		Huntington - 1974
		Ledges - 1975
San Rafael Plan	Bureau of Land Management	Completed in 1973
Land Use Plan	Forest Service	Manti-La Sal NF - To be completed through 1977
		Fishlake NF - 1975
		Uinta NF - To be completed in 1976

APPENDIX III

EMERY GENERATING STATION - FORECAST FIRM PEAK LOADS

User*	1974 Sum. MW	1974 Win. MW	1975 Sum. MW	1975 Win. MW	1976 Sum. MW	1976 Win. MW	1977 Sum. MW	1977 Win. MW	1978 Sum. MW	1978 Win. MW	1979 Sum. MW	1979 Win. MW	1980 Sum. MW	1980 Win. MW
Normal Load Growth	1391	1228	1439	1349	1632	1420	1765	1544	1858	1638	1961	1744	2096	1890
Firm Commitments:														
Sierra Pacific Power			0	50	50	50	50	150	100	200	150	200	150	200
Preference Customers			15	15	19	19	24	24	34	34	47	47	59	59
Moon Lake REA									38	38	47	47	52	52
Kennecott Copper, Magna, Utah					23	23	51	51	51	51	52	52	59	59
California Pacific Utilities Co.			10	10	32	32	36	36	39	39	42	42	46	46
Anaconda Co., Tooele, Utah			10	10	10	10	30	30	30	30	50	50	50	50
Agricultural Products., Soda Sprs., ID			16	16	16	16	16	16	16	16	16	16	16	16
Sub-totals	0	0	51	101	150	150	207	307	308	408	404	454	432	482
Sales contingent on power availability														
Arizona Public Service Co.	100	100	100	100										
Idaho Power Co.							50	110	270	190	130	110	110	320=
Montana Power Co.		100												
Washington Water Power Co.		110		60										
Sub-totals	100	310	100	160	-	-	50	110	270	190	130	110	110	320
TOTALS, Firm Peak Loads	1491	1538	1590	1610	1782	1570	2022	1961	2436	2236	2495	2308	2638	2692
Existing and Projected Generating Capability+	1768	1768	1768	1768	1768	1768	2168	2168	2568	2568	2568	2568	2968	2968
MARGIN# based on generating capability MW	277	230	178	158	-14	198	146	207	132	332	73	260	330	276
# do. Percent	18.6	15.0	11.2	9.8	-0.8	12.6	7.2	10.6	5.4	14.8	2.9	11.3	12.5	10.3
Purchases contingent on power availability														
Washington Water Power Co.			60		60									
Arizona Public Service Co.		100												
Salt River Project, Arizona				100		100		100				50		
Puget Power & Light Co.			140		200		120		180		220			
Sub-totals, purchases	-	100	200	100	260	100	120	100	180	-	220	50	-	-
TOTAL AVAILABLE POWER	1768	1868	1968	1868	2028	1868	2288	2268	2748	2568	2788	2618	2968	2968
MARGIN based on total power available MW	277	330	328	258	246	298	266	307	312	332	293	310	330	276
do Percent	18.6	21.5	20.0	16.0	13.8	19.0	13.2	15.7	12.8	14.8	11.7	13.4	12.5	10.3

* - For explanations, see text.

= - Pending contract revision would reduce to 160 MW available for Washington Water Power Company.

- Negative entry indicates projected demand in excess of projected generating capability.

+ - Includes 1974 steam and hydro capability, Huntington 2nd unit, Emery 1st unit and 2nd unit.

Note: Normal Load Growth (compounded annually) Summer = 7.07% Winter = 7.45%

APPENDIX IV

COAL ANALYSES

IV-1. Rationale for Average- and Worst-Grade Coal Analyses to Be Used for Emission Rate Source Terms

Available data on coal analyses (to represent proposed coal burned in the Emery generating complex) were reviewed to determine estimated emissions. Samples were analyzed from various mines operating in the Hiawatha Bed (Table I). Doelling, 1972 (summarized in Table 2), Doelling, Bureau of Mines (Table 4), and the data provided by UP&L on the Hiawatha Seam of the Deer Creek Mine. Samples of coal from the Wilberg Mine that is being burned in the Huntington Plant (Table 6) were also analyzed.

Based on a comparison of the means, standard deviations, and range of sulfur, ash, and heat values shown in Tables 1 through 5, the analysis in Table 6 appears to be a good representation of the expected coal quality to be mined and used in the Emery power plant. The average values from these samples are:

Percent Sulfur	0.54 ±	.04
Percent Ash	10.10 ±	1.87
Btu/lb	11,719.00 ±	421.00

The ash content of the coal as mined is higher than other analyses because "bone" is analyzed in the "as received" samples. The samples in Table 6 should illustrate the most representative quality of coal to be used in the Emery plant.

Because the potential exists for burning a poorer grade of coal than average during periods of poor dispersion conditions, a worst grade coal analysis has been determined. One standard deviation was arbitrarily selected as the difference between average grade and worst grade coal quality. Therefore, the worst grade coal analysis value to be used in determining the emission rate source term (for calculating maximum ground level concentrations of pollutants, i.e. sulfur dioxide and particulate matter) during most limiting dispersion conditions was estimated to be:

Percent Sulfur:	0.58
Percent Ash :	11.97
Btu/lb :	11,298

The calculated emission rates determined by using the analyses as discussed above are shown in Table 7.

Reference:

Doelling, H.H., Central Utah Coal Fields: Sevier-Sanpete, Wasatch Plateau, Book Cliffs and Emery. Monograph Series No. 3. Utah Geological and Meteorological Survey, 1972.

TABLE 1

Summary of Sample Analysis of "As Received" Coal from the Mines on the Hiawatha Seam

Analysis	Percent Sulfur	Percent Ash	Percent Moisture	Btu/lb
U.S. Fuel Co.	0.7	4.8	6.4	12,840
(Bureau of Mines)	0.6	4.8	5.7	12,930
	0.7	4.4	6.5	12,930
King Mine	0.6	6.0	5.0	12,990
(Bureau of Mines)	0.50	6.0	4.8	12,880
	0.9	4.5	6.5	----
Wattis Mine	1.2	8.4	---	----
(Bureau of Mines)	0.70	8.0	5.2	12,310
Wattis Mine (Hazen Research Inc.)	0.68	9.65	9.40	11,458
Deer Creek Mine (UP&L)	0.59	9.43	6.43	12,192
Deseret Mine	0.56	8.67	5.13	12,451
(UP&L)	0.56	10.30	5.04	12,197
	0.59	7.57	4.67	12,533
	0.60	9.59	5.66	12,189
Deseret Mine (Bureau of Mines)	0.50	6.9	5.2	12,520
Starpoint No. 1 (Bureau of Mines)	0.70	16.7	5.7	10,880
Mean	0.67	7.86	5.8	12,379
Standard Deviation	±0.17	±3.09	±1.18	±601
Range	0.50-1.2	4.4-16.7	4.67-9.40	10,880-12,930

TABLE 2

Average Coal Analyses, Hiawatha Bed

	Number of Analyses	As Received Percent Average	As Received Percent Range
Moisture	46	5.5	2.0-11.4
Ash	43	8.2	4.4-11.2
Sulfur	43	0.67	0.31-1.50
Btu/lb	40	12,448	11,660-13,274

Source: Doelling, 1972, page 199.

TABLE 3
Coal Quality Data for the Wilberg Mine,
Hiawatha Bed, Wasatch Plateau Coal Field

Mine	Percent Sulfur	Percent Ash	Percent Moisture	Btu/lb
Wilberg Mine	0.5	7.3	6.4	12,280
Hiawatha Bed	0.6	8.8	5.3	12,280
	0.7	9.6	6.4	12,110
	0.4	6.6	6.4	12,570
	0.6	8.8	5.2	12,370
	0.6	9.4	4.9	12,410
	0.7	9.2	5.7	12,230
	0.9	9.8	7.7	11,850
	0.5	7.8	5.4	12,460
	0.6	7.3	5.8	12,550
	0.7	9.9	5.1	12,350
	0.8	11.0	5.2	12,120
	0.9	10.3	6.1	11,910
	0.5	8.2	5.4	12.480
	0.5	7.8	4.6	12,660
	0.5	9.6	5.0	12,330
	0.5	10.3	4.8	12,190
	0.6	9.4	5.4	12,250
Mean	0.62	8.9	5.6	12,300
Standard Deviation	±0.14	1.2	0.76	±215
Range	0.4-0.9	6.6-11.0	4.6-7.7	11,850-12,660

Source: Doelling, 1972, page 116.

TABLE 4
Coal Quality Data
Data for the Wilberg Mine,
Hiawatha Bed, Wasatch Plateau Coal Field

Mine	Percent Sulfur	Percent Ash	Percent Moisture	Btu/lb
Wilberg Mine	0.4	8.2	5.4	12,480
Hiawatha Bed	0.5	7.9	4.6	12,660
	0.5	9.6	5.0	12,330
	0.5	10.3	4.8	12,190
	0.6	9.4	5.4	12,230
Mean	0.5	9.1	5.0	12,378
Standard Deviation	±0.1	±1.0	±0.4	±193

Source: Bureau of Mines, October 15, 1959.

TABLE 5
The Proximate and Ultimate Analysis of Coal From the Deer Creek Mine, Hiawatha Seam, Wasatch Plateau Coal Field

Grindability, Hardgrove		46
Proximate Analysis: (As received)		Percent
Size, Inches Maximum		1-5
Moisture		6.43
Volatile Matter		40.67
Fixed Carbon		42.88
Ash		9.43
Sulfur		.59
	TOTAL	100.00
BTU/lb		12,192
Ash Fusion Temperatures (Reducing):		^{o}F
Initial Deformation		2,250
Soft		2,310
Fluid		2,460
Ultimate Analysis:		Percent
Moisture		6.43
Carbon		68.30
Hydrogen		4.91
Nitrogen		.81
Oxygen		10.18
Sulfur		.55
Ash		8.82
	TOTAL	100.00
Chemical Analysis of Ash:		Percent
P_2O_5		.88
SiO_2		51.62
Fe_2O_3		4.73
Al_2O_3		22.30
TiO_2		1.24
CaO		7.80
MgO		.67
SO_3		5.21
K_2O		.34
Na_2O		4.46
Und.		.75
	TOTAL	100.00

Source: UP&L

TABLE 6

Coal Quality Analyses of Coal From the Wilberg Mine,
Received and Analyzed at the
Huntington Power Generating Complex of Utah Power and Light Company

Date	Sulfur(%)	Ash(%)	Btu/lb	Moisture (%)
9- 3-75	.48	8.33	11,854	8.42
9- 5-75	.56	11.44	11,446	8.66
9- 8-75	.58	9.50	11,786	8.33
9- 9-75	.57	9.60	11,748	7.61
9-10-75	.60	10.31	11,673	8.16
9-19-75	.57	10.82	11,845	7.28
9-22-75	.56	12.55	11,508	7.08
10- 9-75	.56	9.57	11,631	9.61
10-10-75	.57	9.08	11,622	10.52
10-23-75	.48	7.86	11,957	9.62
10-28-75	.49	12.50	11,560	7.82
10-29-75	.55	11.50	11,487	7.49
10-30-75	.58	8.06	12,405	7.87
10-31-75	.48	9.52	11.697	9.98
11- 6-75	.58	10.84	11,940	10.06
11- 7-75	.57	9.02	12,090	7.31
11-10-75	.49	15.05	11,073	7.78
11-11-75	.48	9.20	11,948	9.39
11-12-75	.49	9.14	12,211	7.42
11-13-75	.56	10.31	11,649	8.88
11-14-75	.58	7.93	12,342	7.15
11-17-75	.49	7.05	12,060	9.56
11-18-75	.49	10.21	11,854	8.40
11-19-75	.50	8.51	12,054	7.71
11-20-75	.48	8.09	11,934	9.68
11-21-75	.49	9.31	11,929	8.28
11-24-75	.49	10.02	11,811	8.17
11-25-75	.57	8.57	12,061	7.54
11-26-75	.56	13.03	11,209	7.61
11-28-75	.58	8.21	12,370	6.26
12- 1-75	.57	8.51	12,168	7.67
12- 2-75	.57	10.41	11,811	7.77
12- 3-75	.58	9.02	12,253	6.29
12- 4-75	.56	9.00	12,073	7.61
12- 5-75	.58	8.15	12,354	7.12
12- 8-75	.48	8.97	11,792	9.45
12- 9-75	.55	8.38	11,608	11.81
12-10-75	.54	8.32	12,184	7.49
12-11-75	.56	9.06	11,607	10.18
12-12-75	.56	10.61	11,600	8.77
12-15-75	.56	9.00	12,267	9.21
12-16-75	.49	12.91	11,263	8.94
12-17-75	.57	9.70	11,965	7.86
12-18-75	.54	10.82	11,073	12.28
12-19-75	.56	10.21	11,567	9.04
12-22-75	.55	12.23	11,160	10.53
12-23-75	.55	9.30	11,418	11.49
12-26-75	.56	15.94	10,446	8.91
12-29-75	.56	11.41	11,403	9.72
12-30-75	.56	8.50	11,719	10.47
12-31-75	.54	10.68	10,906	13.16
1- 2-76	.52	12.51	11,554	6.96
1- 5-76	.48	12.31	10,750	9.71
1- 6-76	.51	13.41	11,154	9.14
1- 7-76	.57	10.86	11,696	8.07
Mean	0.54	10.10	11,719	8.71
Standard Deviation	$\pm$.04	$\pm$1.87	$\pm$421	$\pm$1.47
Range	.48-.60	7.05-15.94	10446-12405	6.26-13.16

Data provided by UP&L.

TABLE 7

Predicted Emissions and Applicable Emission Control Standards for Proposed Emery Generating Plant

Effluent	Emission rate Without Emission Control (Tons/day)[a] Average Grade	Emission rate Without Emission Control (Tons/day)[a] Worst Grade	Applicable Standard and Allowable Emission Rate (ton/day)		Emission Control to Meet Standard (%) Average Grade	Emission Control to Meet Standard (%) Worst Grade	Committed Emission Control by Applicant (%)	Predicted Emissions (ton/day) Average Grade	Predicted Emissions (ton/day) Worst Grade	(%) Allowable Emissions Average Grade	(%) Allowable Emissions Worst Grade
			EPA	(120)							
SO_2	83	92	UTAH[b]	(120)	0	0	0	83	92	69	77
			EPA	(70)							
NO_x	70	70	UTAH[b,c]		0	0	0	70	70	100	100
			EPA	(10)	98.9	99.1	99.5				
Particulate	859	1058	UTAH[d]					4.29	5.29	43	53

NOTE: Emissions based on 830 MW, 8,300 X 10 Btu/h at 100 percent.

[a]Coal analysis:
Average Grade: Sulfur 0.54 percent by weight, ash content 10.10 percent, heat value 11,800 Btu/lb.
Worst Grade: Sulfur 0.58 percent by weight, ash content 12.00 percent, heat value 11,300 Btu/lb.

[b]Air pollution control equipment and processes shall be selected and operated to afford highest efficiencies and lowest discharge rates that are reasonable and practicable. New installations shall control sulfur dioxide emission as required to avoid exceeding national primary and secondary ambient air quality standards and Federal Standards of Performance for New Stationary Sources.

[c]No nitrogen oxide emission rate sqecified.

[d]No particulate emission rate for new sources under present regulations.

IV-2. Concentrated Trace Analyses of Samples From Deseret and Other Mines in Hiawatha Seam

Concentrated Trace Analyses of Samples from Deseret and Other Mines in Hiawatha Seam

Element	Concentration (ppm)				
	Deseret[a] Mine	Starpoint 1[b]	Deseret[b] Mine	Deseret[b] Mine	Range
Arsenic	.16	1.00	< 1.00	1.00	.16 - 1.00
Boron	11.00	[c]133.50	[c]115.50	[c]121.50	11.00 - 133.50
Beryllium	1.10	[c]0.62	[c]0.23	[c]0.24	0.23 - 1.10
Cadmium	1.60	0.09	< 0.08	< 0.08	< 0.08 - 1.60
Chromium	1.63	[c]6.23	[c]5.39	[c]5.67	1.63 - 6.23
Mercury[d]	0.02	0.06	0.01	0.03	0.01 - 0.06
Manganese	36.10	4.45 ([c]2.67)	5.39 ([c]3.85)	3.24 ([c]2.43)	3.24 - 36.10
Nickel	7.80	[c]2.67	[c]2.31	[c]2.43	2.31 - 7.80
Lead	3.37	3.56 ([c]4.45)	3.85 ([c]3.85)	4.05 ([c]5.67)	3.37 - 4.05
Selenium	2.42	2.40	1.90	2.20	1.90 - 2.42
Vanadium	48.50	[c]8.90	[c]7.70	[c]8.10	7.70 - 48.50
Germanium	0.10				
Fluorine	44.90	50.00	65.00	70.00	45.00 - 70.00
Yttrium	1.00	[c]4.45	[c]5.39	[c]4.05	1.00 - 5.39
Uranium		1.00	1.1215	0.92	
Barium		[c]17.80			
Antimony		0.20			
Cobalt		[c]1.30	[c]1.15	[c]0.81	

[a]Data provided by UP&L.

[b]Data provided by USGS.

[c]Semiquantitative six step spectrographic analysis of the ash.

[d]UP&L Environmental Report (1973, page 96) indicates North Emery Coal analyzed for mercury by flameless atomic absorption and neutron activation varied from 0.035 ppm to 0.090 ppm.

APPENDIX V

AIR QUALITY

V-1. Atmospheric Stability Structure and Stack Emission Behavior

Changes in air temperature with height define the stability of the atmosphere (whether vertical air motions are subdued or amplified). If the air temperature increases with height (termed a temperature inversion), or if it decreases less than the adiabatic lapse rate (defined as a temperature decrease of 1° C per 100 meters), the atmosphere is considered stable. Under these conditions, plume rise and dispersion of emissions are restricted. Stable conditions generally occur with clear skies and light winds at night as a result of radiational cooling. Nighttime conditions are usually characterized by formation of a low-level temperature inversion layer from nocturnal cooling of the earth's surface. The base of the stable layer can be at ground level or at varying elevations above ground. Daytime conditions are characterized by air temperature decreasing with height because of ground-surface heating. During cloudy, windy day or windy night conditions the temperature lapse rate is nearly adiabatic, and the atmosphere is defined as neutrally stable. On a clear summer day, rapid heating of the earth can warm the air near the surface to where the decrease in air temperature with height is greater than the normal adiabatic lapse rate, (superadiabatic). Under these conditions the atmosphere is defined as unstable; marked vertical mixing of air results, and pollutants are dispersed rapidly.

The shape or configuration of a stack plume is largely dependent upon temperature and wind structure influencing the plume. Of primary importance in determining plume behavior, and consequently its effect at

ground level, are the relative heights of the stack plume and the base of an influencing stable air layer. The attached illustration provides an idealized representation of plume behavior under stable, neutral, and unstable atmospheric conditions as well as inversion breakup and limited mixing conditions.

Briggs (1969) has identified and described the typical behavior of smoke plumes associated with diurnal heating effects.

An inversion is formed on clear nights when the ground radiates heat and surface air is cooled. This stable layer may be one or two thousand meters deep, so plumes rising through it rapidly reach equivalent buoyancy level. This is the fanning type plume characteristic of clear skies and light winds at night or in early morning.

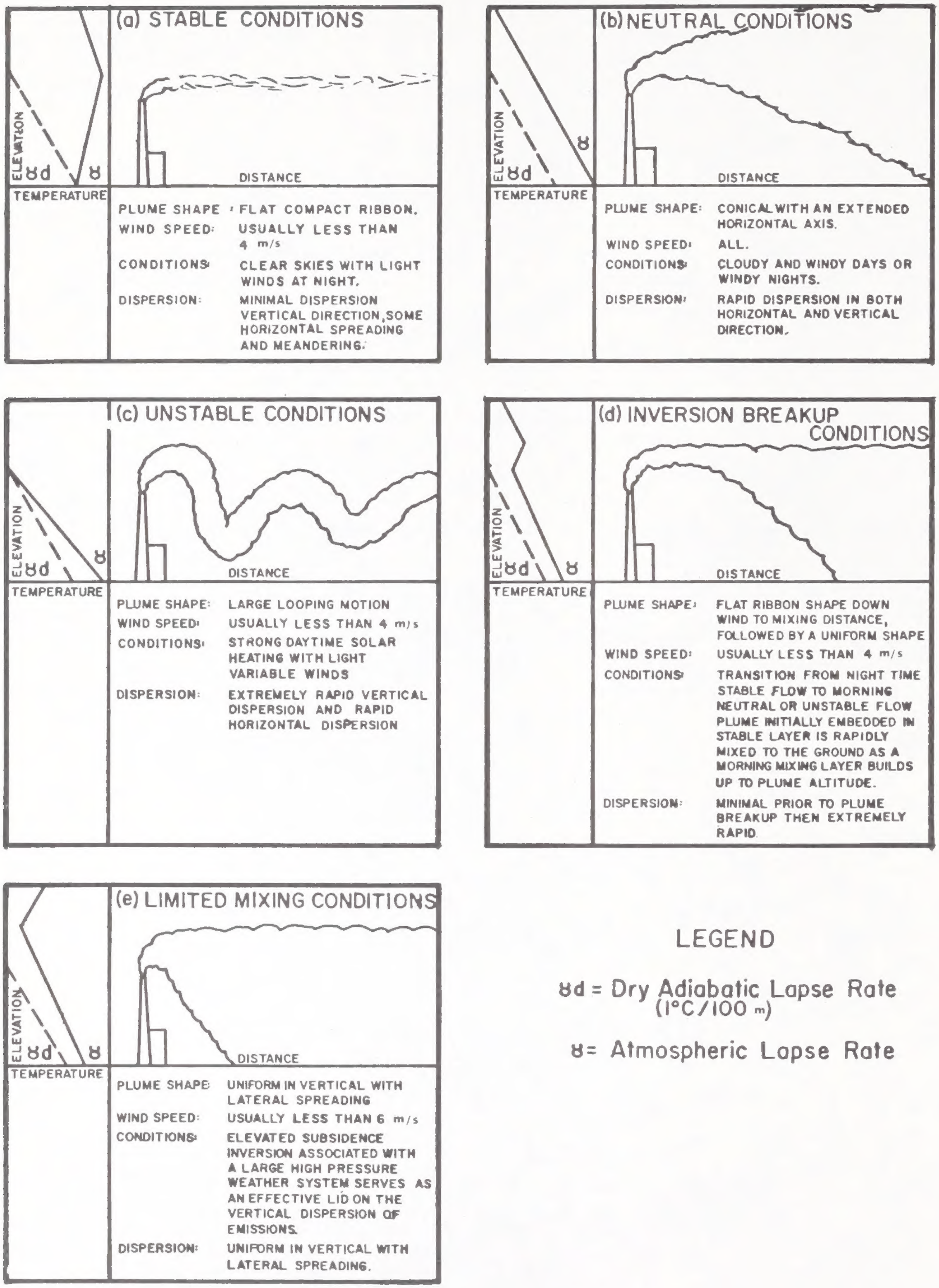
After sunrise the ground warms and temperature increase associated with height then changes to a decrease with height to remove the surface inversion (burnoff). Convective eddies develop and penetrate higher as daytime ground heating progresses. When the eddies reach the height of the plume, they rapidly mix the plume toward the ground while the inversion aloft prevents upward diffusion. This inversion breakup condition, called fumigation, can bring relatively large concentrations of effluent to ground level.

After an inversion has been destroyed by convection, or during cloudy and windy days or windy nights, the atmosphere is well mixed and has essentially neutral stability. Plumes then rise and diffuse in a smooth fashion known as coning.

Later in the day when heating at the ground intensifies, the lapse rate becomes unstable and large convective eddies form to twist

and fragment the plume in a manner described as looping. Short periods of relatively high concentrations are experienced whenever the looping plume reaches the ground.

Near sunset, convection diminishes and a ground-based radiation inversion begins to form again. The plume can penetrate this weak inversion, but cannot diffuse downward because of the underlying stable conditions. This condition called lofting is the most ideal for releasing effluents since the effluents are least likely to reach the ground. The limited mixing condition consists of an elevated inversion with a neutral or well mixed layer below. The inversion generally acts as a lid to effectively reduce vertical dispersion of emissions. The emissions are trapped within the mixing volume as determined by height of the inversion base and surrounding terrain.



LEGEND

γ_d = Dry Adiabatic Lapse Rate (1°C/100 m)

γ = Atmospheric Lapse Rate

IDEALIZED DISPERSION PATTERNS FROM A TALL STACK UNDER VARYING ATMOSPHERIC CONDITIONS

V-2. Federal and State of Utah Air Quality Standards

Air quality standards for stack emission and ambient air have been promulgated by state and federal agencies in accordance with the Clean Air Act of 1970 as amended. Federal emission standards are shown in Table 1, Ambient Air Quality Limitations are shown in Table 2. Limitations of the Prevention of Significant Deterioration Regulation are shown in Table 3.

The regulations of the Occupational Safety and Health Administration (OSHA), the Mining Enforcement Safety Administration (MESA), and the Utah Department of Environmental Health, specify air quality limitations in working areas.

TABLE 1

Federal and State Pollution Emission Rate Limitations for Coal-Fired Power Plants

Emission	Maximum Allowable Emission Rate (pounds per million Btu heat input)	
	Federal	Utah
Sulfur Dioxide	1.20	1.20
Nitrogen Oxides	0.70	[a,b]---
Particulate Matter	0.10	[a,c]---
Plume Opacity	Ringlemann Unit #1	Ringlemann Unit #1

Source: Federal Register, Vol. 36, 247, December 23, 1971, Pages 24876 to 24895.

[a]Air pollution control equipment and processes shall be selected and operated to afford highest efficiencies and lowest discharge rates that are reasonable and practicable. New installations shall control sulfur dioxide emissions as required to avoid exceeding national primary and secondary ambient air quality standards and federal standards of performance for new stationary sources.

[b]No nitrogen oxide emission rate specified.

[c]No particulate matter emission rate for new sources specified.

TABLE 2

Federal and State Ambient Air Quality Standards

Emission	Federal Standards μg/m^3 (p/m) Primary	Federal Standards μg/m^3 (p/m) Secondary	Utah Standard μg/m^3 (p/m)
Sulfur Dioxide			
Annual[a]	80 (0.03)		80 (0.03)
24 hour[b]	365 (0.14)		365 (0.14)
3 hour[b]		1,300 (0.50)	1,300 (0.50)
Particulate Matter			
Annual[c]	75	60	d---
24 hour	260	150	d---
Nitrogen Dioxide			
Annual	100 (0.05)	100 (0.05)	d---
Oxidants			
1 hour[b]	160 (0.08)	(0.08)	d---
Carbon Monoxide			
8 hour[b]	10,000 (9.0)		d---
1 hour[b]	40,000 (35.0)		d---
Hydrocarbons			
3 hour[b]	160 (0.24)		d---

Source: 40 CFR 50; 36 FR 22384, November 25, 1971; as amended by 38 FR 25678, September 14, 1973; 40 CFR 7042, February 18, 1975.

[a] Annual arithmetic mean

[b] Not to be exceeded more than once a year

[c] Annual geometric mean

[d] Federal Standards are quoted in the Utah regulations, but have not been formally adopted by the State. Federal standards are enforceable in Utah.

TABLE 3

Area Designations and Allowable Increases in Pollutant Concentrations Over the Baseline Air Quality Concentration

Pollutant	Class I[a] ($\mu g/m^3$)	Class II[a] ($\mu g/m^3$)	Class III[a] ($\mu g/m^3$)
Particulate matter			
Annual geometric mean	5	10	-
24-hour maximum	10	30	-
Sulfur dioxide			
Annual arithmetic mean	2	15	-
24-hour maximum	5	100	-
3-hour maximum	25	700	-

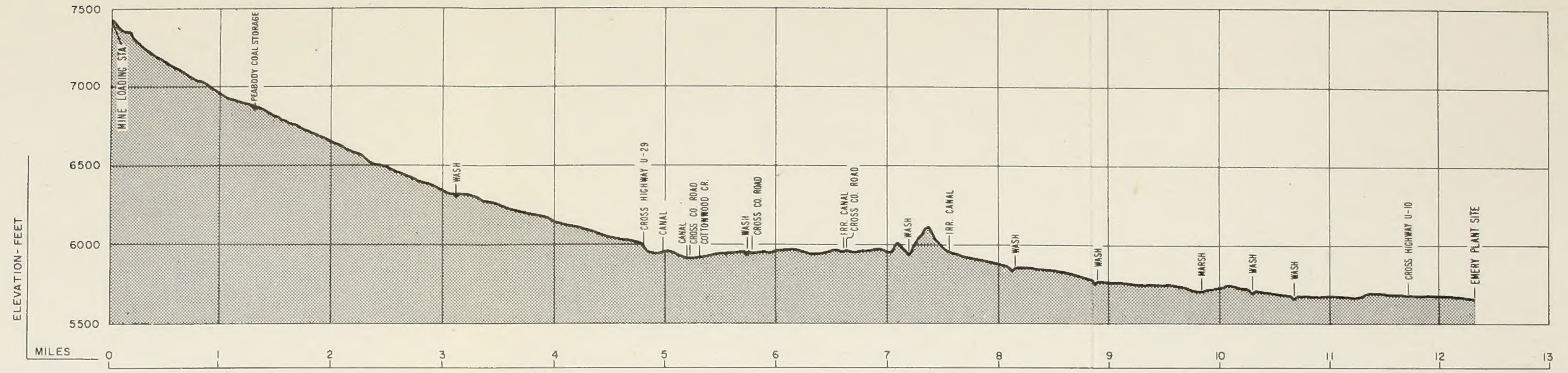
Source: EPA air quality implementation plans. Prevention of significant air quality deterioration. Federal Register Vol. 38, No. 235, Thursday, December 5, 1975.

Note: Air quality concentrations are described in Federal Significant Deterioration Regulations and in Utah Air Conservation Regulation, 9 July 1975, Section 1.3, Air Quality Degradation Regulated:

"In areas of present high air quality where measured or estimated ambient levels of controllable pollutants are below the levels specified by applicable standards, any emission of pollutant to the ambient air must be shown to result in pollution levels within applicable ambient air standards and will be prohibited in any case unless shown to be controlled to afford the highest efficiencies and the lowest discharge rates that are reasonable and practicable."

[a] Class I applies to areas in which practically any change in air quality would be considered significant. Class II applies to areas in which deterioration normally accompanying moderate, well-controlled growth would be considered insignificant. All values are allowable increases in pollutant concentrations over the baseline air quality concentration, Areas designated as Class III shall be limited to concentrations of particulate matter and sulfur dioxide no greater than national ambient air quality standards.

[b] Utah also has rules and regulations for air pollution control which require measures to be taken to prevent deterioration of air quality.



EROSION HAZARD: EXISTING ROAD (COUNTY) | MODERATE | HIGH | EXISTING ROAD (STATE) | HIGH | EXISTING ROAD

POTENTIAL FOR VEGETATION RECOVERY: EXISTING ROAD | 50-70 % | < 30 % | EXISTING ROAD | <30% | EXISTING ROAD

VEGETATION TYPES: EXISTING ROAD | Gw | R | At | F | At | F | At | F | Gw | F | EXISTING ROAD | F | EXISTING ROAD

WILDLIFE: D-W EXISTING ROAD | R-W Jr | Up | Wf | Up R-W EXISTING ROAD | R

CULTURAL RESOURCES: SURVEYS HAVE NOT BEEN COMPLETED - LOW POTENTIAL

SCENIC RESOURCES

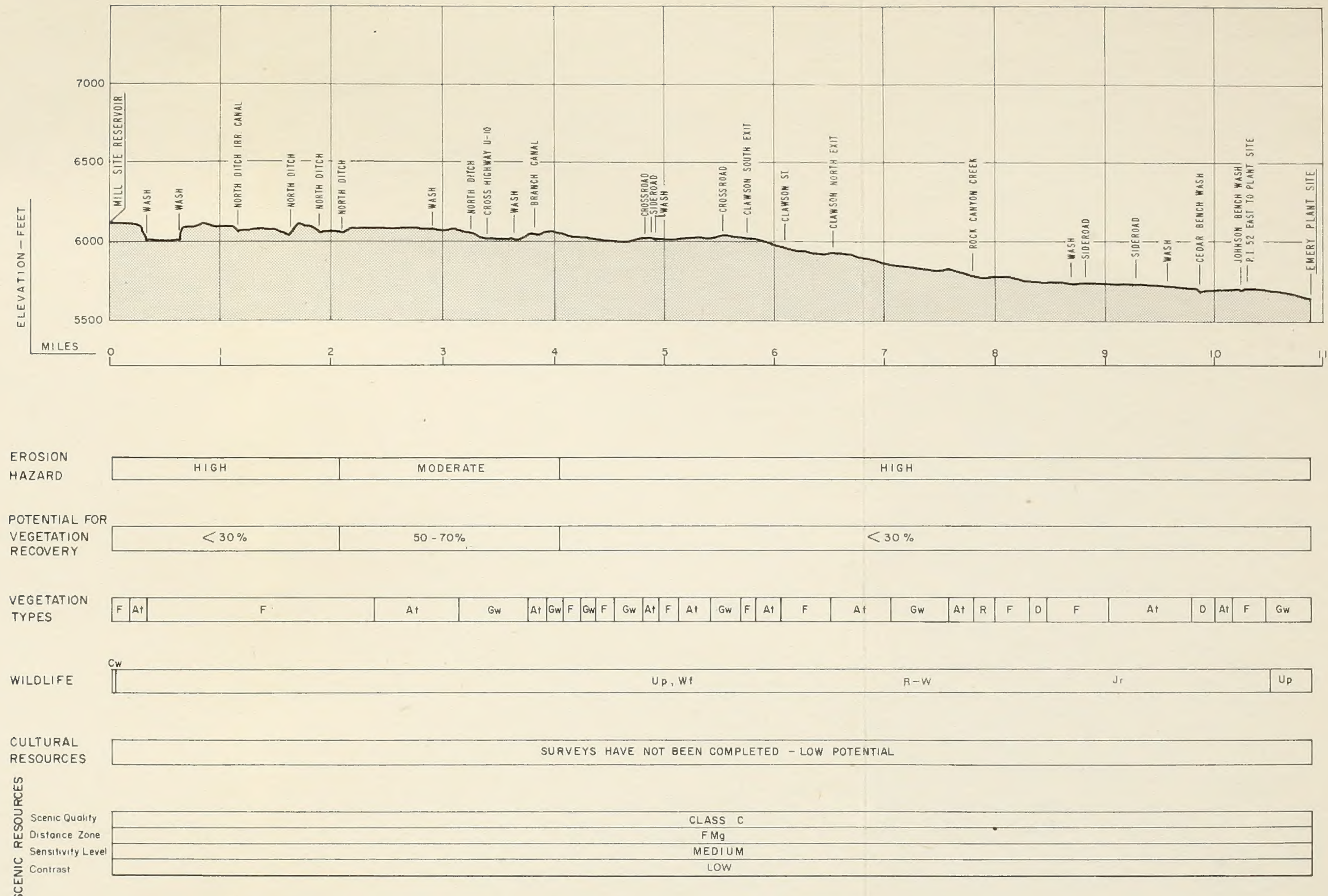
Scenic Quality: CLASS B | CLASS C
Distance Zone: FMg
Sensitivity Level: MEDIUM
Contrast: LOW

LEGEND

EROSION	VEGETATION RECOVERY	VEGETATION TYPES	WILDLIFE	CULTURAL RES.	SCENIC RES
SEE NARRATIVE	SEE NARRATIVE	C - MIXED FOREST	E - ELK	SEE NARRATIVE	FMg - FOREGROUND, MIDDLE-GROUND
		Mb - MTN. BRUSH	D - DEER		Bg - BACKGROUND
		Pj - PINYON-JUNIPER	Up - UPLAND GAME		Ss - SELDOM SEEN
		S - SAGEBRUSH	Wf - WATERFOWL		SEE NARRATIVE
		G - GRASSLAND	Cw COLD WATER FISH		
		Gw GREASEWOOD	R - RAPTORS		
		At - SALTBRUSH	Jr - JACK RABBIT		
		R - RIPARIAN	Ww - WARM WATER FISH		
		Ms - MARSH	W - WINTER		
		D - SALTGRASS	S - SUMMER		
		F - AGRICULURAL LAND	Yl - YEARLONG		
		A - ASPEN			

APPENDIX VI-1

COAL HAUL ROAD

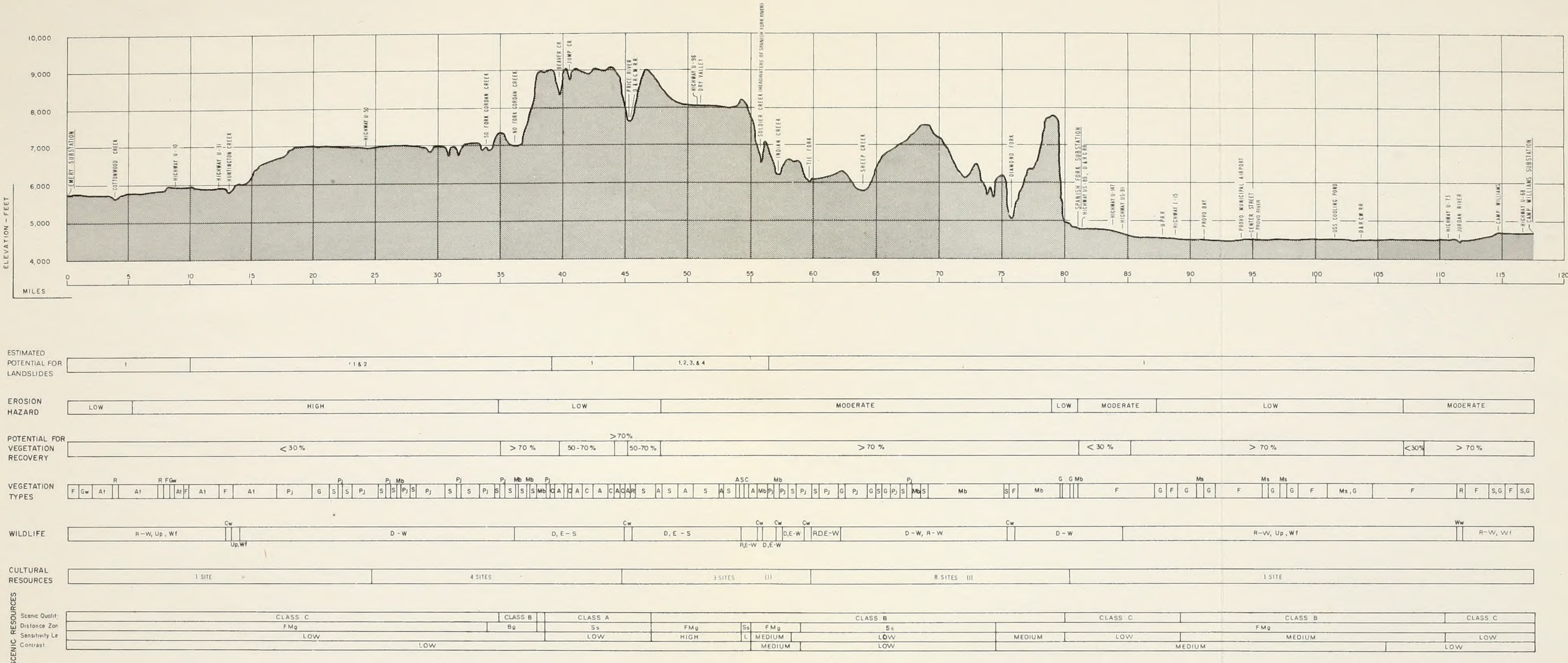


LEGEND

EROSION	VEGETATION RECOVERY	VEGETATION TYPES	WILDLIFE	CULTURAL RES	SCENIC RES
SEE NARRATIVE	SEE NARRATIVE	C - MIXED FOREST Mb - MTN BRUSH Pj - PINYON-JUNIPER S - SAGEBRUSH G - GRASSLAND Gw GREASEWOOD At - SALTBRUSH R - RIPARIAN Ms MARSH D - SALTGRASS F - AGRICULURAL LAND A - ASPEN	E - ELK D - DEER Up - UPLAND GAME Wf - WATERFOWL Cw COLD WATER FISH R - RAPTORS Jr - JACK RABBIT Ww - WARM WATER FISH W - WINTER S - SUMMER Yl - YEARLONG	SEE NARRATIVE	FMg - FOREGROUND, MIDDLE-GROUND Bg BACKGROUND Ss - SELDOM SEEN SEE NARRATIVE

APPENDIX VI-2

PIPE LINE



LEGEND

LANDSLIDES

1 STABLE
2 MODERATELY UNSTABLE
Small movement, low risk of landslides
3 MODERATELY UNSTABLE
Evidence of past slides; moderate to high risk of landslides
4 UNSTABLE
Recent or continuing extensive land movements. High risk of landslides

EROSION

SEE NARRATIVE

VEGETATION RECOVERY

SEE NARRATIVE

VEGETATION TYPES

C - MIXED FOREST
Mb - MTN. BRUSH
Pj - PINYON-JUNIPER
S - SAGEBRUSH
G - GRASSLAND
Gw - GREASEWOOD
At - SALTBRUSH
R - RIPARIAN
Ms - MARSH
D - SALTGRASS
F - AGRICULURAL LAND
A - ASPEN

WILDLIFE

E - ELK
D - DEER
Up - UPLAND GAME
Wf - WATERFOWL
Cw - COLD WATER FISH
R - RAPTORS
Jr - JACK RABBIT
Ww - WARM WATER FISH
W - WINTER
S - SUMMER
YL - YEAR LONG

CULTURAL RES.

( ) INDICATES NUMBER OF SITES POTENTIALLY ELIGIBLE FOR NOMINATION TO THE NATIONAL REGISTER OF HISTORIC PLACES

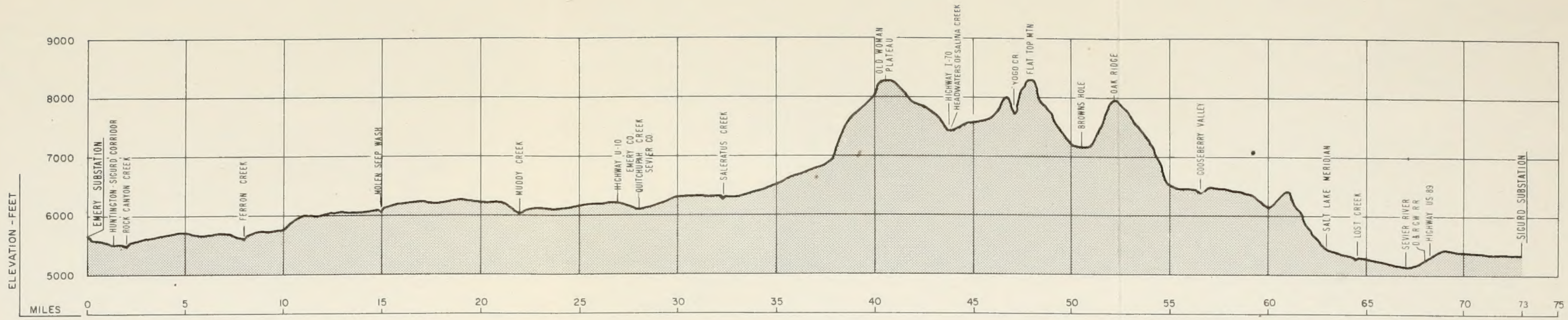
SCENIC RES.

FMg - FOREGROUND, MIDDLE-GROUND
Bg - BACKGROUND
Ss - SELDOM SEEN

SEE NARRATIVE

APPENDIX VI-3

EMERY-SPANISH FORK CANYON-CAMP WILLIAMS TRANSMISSION LINE



POTENTIAL FOR LANDSLIDES: ESTIMATED 1 | ESTIMATED 1,2&3 | 1 | 3 | 2 | 1 | 2 | 1 | 2 | 1 & ? | 2 | 3 | 1 | 4 | 2 | 4 | 3 | 2 | 3 | 2 | 1&2 | 1 | 3 | DOUBLE CIRCUIT LINE

EROSION HAZARD: LOW | HIGH | MODERATE | HIGH | MODERATE | LOW | MODERATE | HIGH | MODERATE | HIGH | LOW | MODERATE | LOW | MODERATE | HIGH | MODERATE

POTENTIAL FOR VEGETATION RECOVERY: < 30 % | 50-70% | < 30 % | 50-70 % | > 70 % | 50-70 % | < 30 % | 50-70 %

VEGETATION TYPES: At | F | R | F | At | F | R | F | At | F | R | F | S | At | S | Pj | S | R | Pj | C | Pj | Mb | S | Pj | Mb | Pj | At | Gw | F | Gw

WILDLIFE: Jr, R-W | Up, Wf, R-W | R-W, Jr | Up, Wf, R-W | R-W, Jr | D-W, R-W | D - W, R-W, E-W | R-W, D-W | Cw | D-W, R-W | Cw | D, E, R, - W | Cw | Up, Wf, R-W

CULTURAL RESOURCES: 6 SITES (1) | 6 SITES | 3 SITES | 11 SITES (2) | 3 SITES | 1 SITE | 1 SITE | 6 SITES | 3 SITES | 13 SITES | 3 SITES

SCENIC RESOURCES

- Scenic Quality: CLASS C | CLASS B | CLASS A | CLASS B | CLASS C
- Distance Zone: F M g | Ss | FMg | Ss | FMg
- Sensitivity Level: MEDIUM | LOW | HIGH | LOW | HIGH | LOW
- Contrast: LOW

LEGEND

LANDSLIDES

1 - STABLE
2 - MODERATELY UNSTABLE
Small movement, low risk of landslides
3 - MODERATELY UNSTABLE
Evidence of past slides, moderate to high risk of landslides
4 - UNSTABLE
Recent or continuing extensive land movements. High risk of landslides

EROSION

SEE NARRATIVE

VEGETATION RECOVERY

SEE NARRATIVE

VEGETATION TYPES

C - MIXED FOREST
Mb - MTN BRUSH
Pj - PINYON-JUNIPER
S - SAGEBRUSH
G - GRASSLAND
Gw - GREASEWOOD
At - SALTBRUSH
R - RIPARIAN
Ms - MARSH
D - SALTGRASS
F - AGRICULURAL LAND
A - ASPEN

WILDLIFE

E - ELK
D - DEER
Up - UPLAND GAME
Wf - WATERFOWL
Cw - COLD WATER FISH
R - RAPTORS
Jr - JACK RABBIT
Ww - WARM WATER FISH
W - WINTER
S - SUMMER
Yl - YEARLONG

CULTURAL RES

( ) INDICATES NUMBER OF SITES POTENTIALLY ELIGIBLE FOR NOMINATION TO THE NATIONAL REGISTER OF HISTORIC PLACES

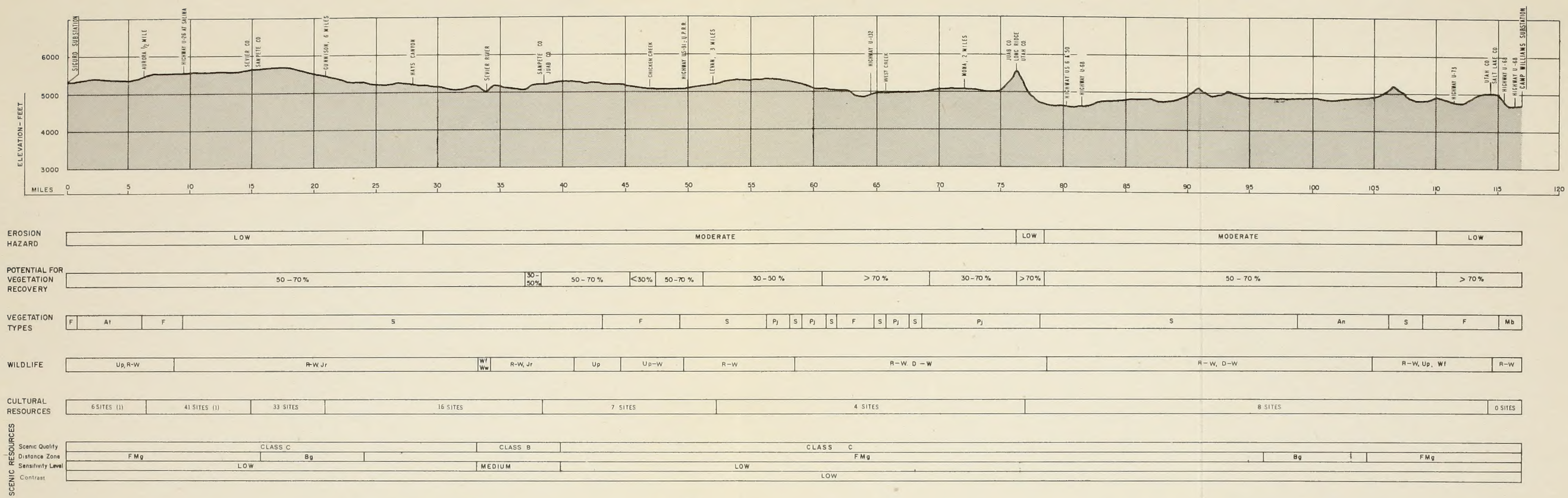
SCENIC RES

FMg - FOREGROUND, MIDDLE-GROUND
Bg - BACKGROUND
Ss - SELDOM SEEN

SEE NARRATIVE

APPENDIX VI-4

EMERY-SALINA CANYON-SIGURD TRANSMISSION LINE

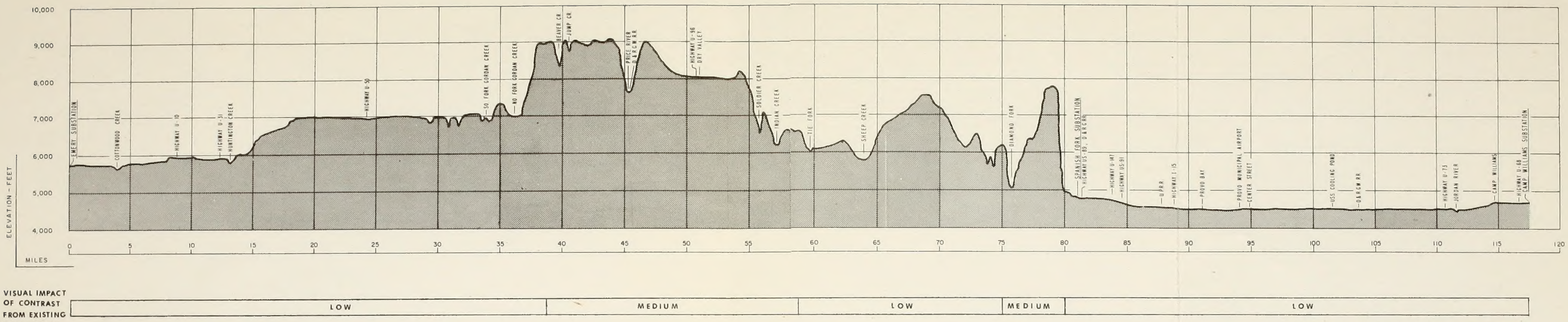


LEGEND

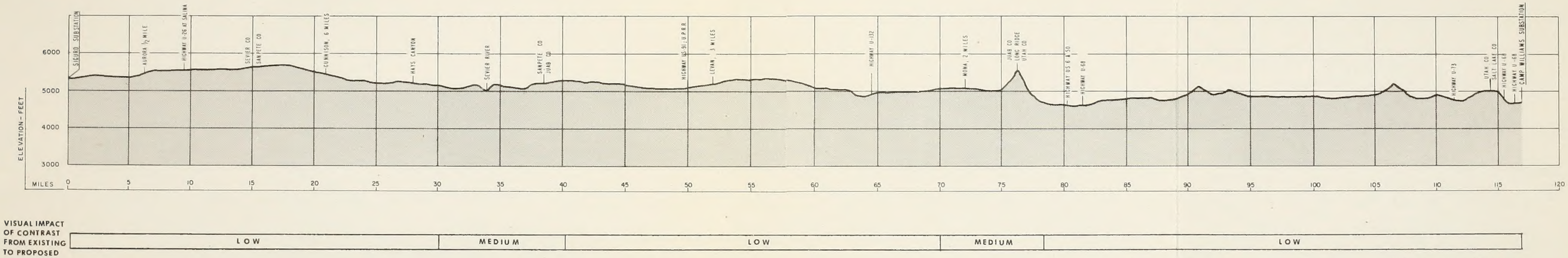
EROSION	VEGETATION RECOVERY	VEGETATION TYPES	WILDLIFE	CULTURAL RES	SCENIC RES
SEE NARRATIVE	SEE NARRATIVE	C - MIXED FOREST Mb - MTN. BRUSH Pj - PINYON - JUNIPER S - SAGEBRUSH G - GRASSLAND Gw - GREASEWOOD At - SALTBRUSH R - RIPARIAN Ms - MARSH D - SALTGRASS F - AGRICULURAL LAND A - ASPEN An - ANNUALS	E - ELK D - DEER Up - UPLAND GAME Wf - WATERFOWL Cw - COLD WATER FISH R - RAPTORS Jr - JACK RABBIT Ww - WARM WATER FISH W - WINTER S - SUMMER Yl - YEAR LONG	( ) INDICATES NUMBER OF SITES POTENTIALLY ELIGIBLE FOR NOMINATION TO THE NATIONAL REGISTER OF HISTORIC PLACES	FMg FOREGROUND, MIDDLE-GROUND Bg - BACKGROUND Ss - SELDOM SEEN SEE NARRATIVE

APPENDIX VI-5

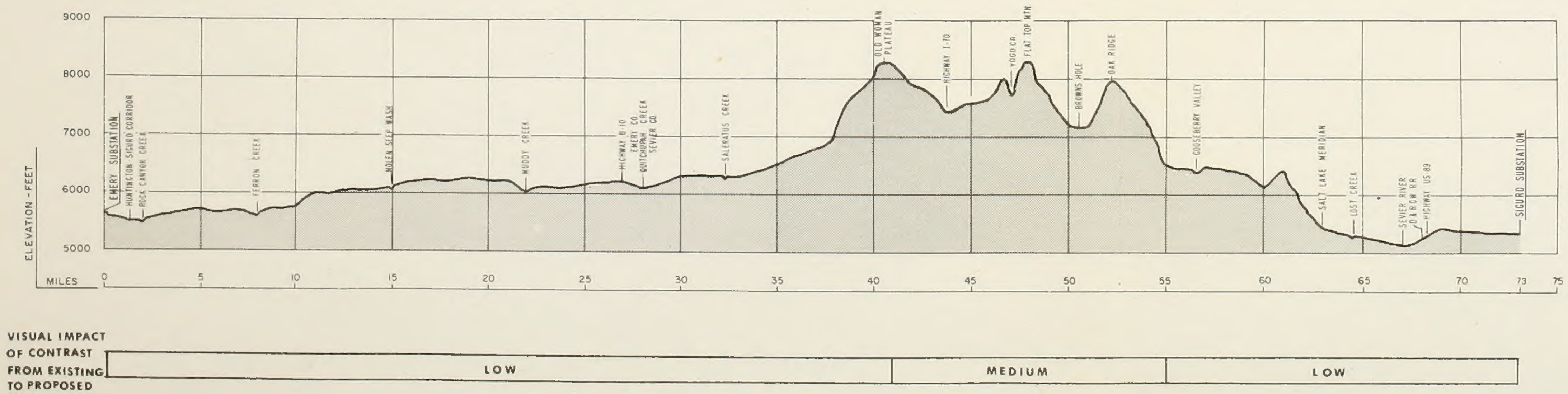
SIGURD-CAMP WILLIAMS TRANSMISSION LINE



EMERY— SPANISH FORK CANYON— CAMP WILLIAMS



SIGURD — CAMP WILLIAMS



EMERY — SALINA CANYON — SIGURD

APPENDIX VI-6

MAGNITUDE OF CONTRAST– TRANSMISSION LINES

APPENDIX VII

VEGETATIVE SPECIES

VII-1. Major Plant Communities and Typical Species Occurring in Central Utah

Plant Community	Major Vegetative Species	
Aspen	Quaking aspen	*Populus tremuloides*
	Tailcuplupine	*Lupinus caudatus*
	Nodding brome	*Bromus anomalus*
Greasewood	Greasewood	*Sarcobatus vermiculatus*
	Saltbrush	*Atriplex powellii*
	Alkali sacaton	*Sporobolus airoides*
Grassland	Squirreltail grass	*Sitanion hystrix*
	Sandberg bluegrass	*Poa secunda*
	Sticky rabbitbrush	*Chrysothamnus viscidiflorus*
Mixed Conifer	Quaking aspen	*Populus tremuloides*
	Douglas fir	*Pseudotsuga menziesii*
	Mountain juniper	*Juniperus scopulorum*
Mountain Brush	Mountain snowberry	*Symphoricarpos oreophilus*
	Gambel oak	*Quercus gambelii*
	Yarrow	*Achillea millefolium*
Pinyon-Juniper	Gambel oak	*Quercus gambelii*
	Utah juniper	*Juniperus osteosperma*
	Pinyon pine	*Pinus edulis*
Riparian	Fremont poplar	*Populus fremontii*
	Sandbar willow	*Salix exigua*
	Kentucky bluegrass	*Poa pratensis*
Saltbush	Mat saltbush	*Atriplex corrugata*
	Castle Valley cover	*Atriplex cuneata*
	Buckwheat	*Eriogonum gordonii*
Saltgrass	Saltgrass	*Distichlis stricta*
	Bulrush	*Scirpus* spp.
Sagebrush	Big sagebrush	*Artemisia tridentata*
	Indian ricegrass	*Oryzopsis hymenoides*
	Cheatgrass	*Bromus tectorum*

VII-2. Threatened and Endangered Plant Species Occurring in Central Utah

Cymopterus coulteri	**Phacelia argillacea*
Cymopterus rosei	*Phacelia demissa*
**Cycladenia humilis*	**Phacelia rafaelensis*
**Ascelepias ruthiae*	*Phacelia utahensis*
**Erigeron maguirei*	**Festuca dasyclada*
**Pathnenium ligulatum*	*Gilia mcvickerae*
Townsendia aprica	**Eriogonum corymbosum*
**Cryptantha johnstonii*	*Eriogonum ostlundii*
**Cryptantha jonesiana*	**Eriogonum smithii*
**Sclerocactus wrightii*	*Penstemon abietinus*
Euphorbia nephradenia	*Penstemon wardii*
Silene petersonii	
Atriptex bonnevillensis	
Astragalus deserticus	
Astragalus lentiginosus var. *chartaceous*	
Astragalus loanus	
**Astragalus pardalinus*	
**Astragalus refaelensis*	
**Peteria thompsonae*	
Geranium marginale	

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*Occur in Carbon and Emery counties.

VII-3. Threatened and Endangered Plant Species Occurring in Garfield and Kane Counties

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Cymopterus newberryi

Lomatium minimum

Asclepias ruthiae

Erigeron abajoensis

Erigeron religiosus

Hymenopappus filifolius var. *tomentosus*

Viguiera soliceps

Cryptantha ochroleuca

Draba sobolifera

Draba subalpina

Lesquerella rubicundula

Sclerocactus whipplei var. *spinosior*

Arenaria stenomeres

Euphorbia nephradenia

Astragalus lancearius

Astragalus malacoides

Astragalus striatiflorus

Peteria thompsonae

Psoralea epipsila

Phacelia cephalotes

Oenothera megalanth

Phlox gladiformis

Eriogonum aretioides

Eriogonum jamesii var. *rubicold*

Primula specuicola

VII-4. Threatened and Endangered Plant Species Occurring in Sevier, Sanpete, Utah, and Juab Counties

Cymopterus coulteri

Cymopterus rosei

Townsendia aprica

Silene petersonii

Atriplex bonnevillensis

Astragalus deserticus

Astragalus lentiginosus var. *chartaceous*

Astragalus loanus

Geranium marginale

Phacelia demissa

Phacelia utahensis

Gilia mcvickerae

Eriogonum ostlundii

Penstemon abietinus

Penstemon wardii

APPENDIX VIII

GROUND WATER ANALYSES

Ground Water Analysis - Emery Site (June 16, 1974)

Item	East Test Pit	Center Test Pit	Drainage Stream	West Test Pit
	(mg/ℓ)			
Dissolved Solids[a]	5,210	2,890	3,110	5,780
Bicarbonate (HCO_3)	282	357	380	406
Chloride (Cℓ)	42	58	22	23
Sulfate (SO_4)	3,950	4,950	2.175	5,200
Silica (SiO_2)	6	9	14	8
Hardness (as $CaCO_3$)	1,800	2,080	980	1,860
Calcium (Ca)	432	448	152	424
Magnesium (Mg)	176	234	146	195
Sodium (Na)	1,180	1,580	760	1,600
Potassium (K)	15	18	10	15
Iron (Fe)	[b]<0.05	<0.05	<0.10	<0.05
Copper (Cu)	<0.05	<0.05	<0.05	<0.05
Suspended Solids (p/m)	5-10	5-10	25	5-10
pH Value @ 25°C (mg/ℓ)	7.9	8.0	7.8	7.8
Conductivity @25°C (μmho/cm)[c]	6,950	7,850	4,150	7,700

[a]Calculated from conductivity

[b]< = Less than

[c]μmho/cm = micromhos per centimeter

Ground Water Analysis - Emery Site
(July 11, 1974)

Item	Drainage Stream	East Test Pit
	(mg/ℓ)	
Dissolved Solids[a]	2,100	5,400
Hydroxide	0	0
Carbonate	18	15
Bicarbonate	439	258
Chloride	16	55
Sulfate	1,225	4,150
Silica	12	4
Nitrate	1.2	
Hardness	820	2,270
Calcium	124	512
Magnesium	124	242
Sodium	430	1,375
Potassium	7.1	
Iron	0.10	[b]<0.05
Copper	<0.05	<0.05
Manganese	<0.05	<0.05
Suspended Solids (p/m)	9	8
pH Value @ 25°C (mg/ℓ)	8.3	8.2
Conductivity @ 25°C (μmho/cm)[c]	2,800	7,200

[a]Calculated from conductivity

[b]< = Less than

[c]μmho/cm = micromhos per centimeter

APPENDIX IX

RATIONALE FOR DETERMINATION OF LOSS OF POUNDS OF LIVE BEEF

The crop land, that would be affected by the proposed project, produces forage crops or grains for livestock forage. The forage and grain yields can be converted into equivalent pounds of beef production. The average annual per capita consumption of beef can be applied to provide a representation of the number of people who might be affected by the lost production. The following two paragraphs illustrate the method for calculating losses for all affected crop land. The acreage is based on past average annual usage of 3.92 acre-feet of irrigation water per acre in the area (VTN, 1975). This would result in a loss of approximately 985 acres of alfalfa hay and 800 acres of barley or small grains. Total crop yield losses would be approximately 2,955 tons of alfalfa hay and 1,040 tons (43,200 bushels) of barley, annually (based on an average annual yield of 3 tons of alfalfa hay and 54 bushels of barley per acre for Emery County [Utah Dept. of Agriculture, 1973]).

According to estimates of the Production Credit Association of Richfield, Utah, approximately 100 pounds of live beef can be produced from 1 ton of alfalfa hay, and approximately 150 pounds of live beef can be produced from 1 ton (42 bushels) of barley, including an estimated livestock loss of 10 percent.

The U.S. Department of Agriculture figures indicate the dressed weight of beef is 56.2 percent live weight. The 1975 average annual per capita consumption of beef was 88.9 pounds (USDA Utah Crop and Livestock Reporting Service, 1976). This is equivalent to 270,350 pounds dressed weight of beef, and therefore represents the loss of average beef consumption by 3,041 persons yearly due to this conversion of 7,000 acre-feet of water from agricultural to industrial use.

APPENDIX X

ECONOMIC ANALYSIS OF LAND USE BASED ON 1976 DOLLARS

Freeway Route (Overhead)

Present Loss	20 lots & houses	$1,000,000
Future loss	75 lots & houses	3,950,000
	Total	$4,950,000

Based on: 80 foot frontage lots
10,000 feet total length
less 4,000 feet existing development
75-80 foot lots lost

Present loss for the year 1976 and future loss to the year 2000.

Freeway Route (Underground)

Present loss	3 lots & houses	$ 150,000
Future loss	7 lots & houses	350,000
	Total	$ 500,000

Based on: 2,000 feet of line (Geneva St.)
50 ft. right-of-way
2.5 acres (10 lots)

Middle Route (Overhead)

Present loss	15 lots & houses	$ 750,000
Future loss	165 lots & houses	8,250,000
	Total	$9,000,000

Based on: 120 ft. right-of-way
17,000 ft. length
45 acres (180 lots)
4 lots/acre

Middle Route (Underground)

Present loss	15 lots & houses	$ 750,000
Future loss	65 lots & houses	3,250,000
	Total	$4,000,000

Based on: 50 foot right-of-way
17,000 ft. long
20 acres (80 lots)
4 lots/acre

Goshen Bay Route

250 acres of agricultural land
Present value $4,000 per acre = $1,000,000

ANNUAL PRODUCTION VALUE ON AGRICULTURAL LAND*

Crop	Per Acre Production	Total Producton	Total Value
Alfalfa	7 tons	1,750 tons	$105,000
Silage	20 tons	5,000 tons	100,000
Wheat	100 bu	25,000 bu	81,250
Barley	100 bu	25,000 bu	62,500

*Current value based on production capacity, not actual production.

Crop Unit Value (1976)

Alfalfa	$60.00/ton
Silage	20.00/ton
Wheat	3.25/bu
Barley	2.50/bu

LIST OF ABBREVIATIONS

LIST OF ABBREVIATIONS

(General)

AAQS	Ambient Air Quality Standards
a.c.	alternating current
A.D.	(anno Domini), in the year of our Lord
AEC	Atomic Energy Commission
AGL	above ground level
AM	amplitude modulation
AQMA	Air Quality Maintenance Area
B.C.	before Christ
BLM	Bureau of Land Management
BOR	Bureau of Outdoor Recreation
BYU	Brigham Young University
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COG	Council of Governments
d.c.	direct current
DES	draft environmental statement
DRI	Denver Research Institute
E	east
EIS	environmental impact statement
E.O.	Executive Order
EPA	Environmental Protection Agency
ERDA	Energy Research and Development Administration
ES	environmental statement
FAA	Federal Aviation Administration
FCC	Federal Communications Commission

LIST OF ABBREVIATIONS (continued)

FES	final environmental statement
FGD	flue gas desulfurization
FPC	Federal Power Commission
F.R.	Federal Register
FWPCA	Federal Water Pollution Control Administration
ICPA	Intermountain Consumers Power Association
IPP	Intermountain Power Project
MESA	Mining Enforcement and Safety Administration
MFP	management framework plan (used by Federal Government agencies)
MRI	Meteorology Research Incorporated
MSL	mean sea level
N	north
NAAQS	National Ambient Air Quality Standards
NAS	National Academy of Science
NAWC	North American Weather Consultants
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen (nitrogen oxides)
NPS	National Park Service
NRA	National Recreation Area
NRC	Nuclear Regulatory Commission
NRL	national resource lands (lands administered by the BLM)
NSF	National Science Foundation
NSPS	New Source Performance Standards

LIST OF ABBREVIATIONS (continued)

OEP	Office of Emergency Preparedness
ORV	off-road vehicle
OSHA	Occupational Safety and Health Administration
P.L.	public law
PSDR	Prevention of Significant Deterioration Regulations
Pu^{239}	plutonium-239, an artificial radioactive isotope of the element plutonium
R.	range
REA	Rural Electrification Administration
R.S.	revised statutes
S	south
SCS	Soil Conservation Service
sec.	section
SEDS	Socio-Economic Data System
SEUAG	Southeastern Utah Association of Governments
SF_6	sulfur hexafluoride
SMSA	standard metropolitan statistical area
SO_2	sulfur dioxide
SRI	Stanford Research Institute
Stat.	statutes at large
T.	township
TDS	total dissolved solids
T/L	transmission line
U^{235}	uranium-235, an isotope of the element uranium
U^{238}	uranium-238, an isotope of the element uranium
U_3O_8	product of uranium refinement containing U^{238} (sometimes called yellow cake)

LIST OF ABBREVIATIONS (continued)

UBAQ	Utah Bureau of Air Quality
U.C.A.	Utah Code annotated
UDH	Utah Department of Health
UDWR	Utah Division of Wildlife Resources
UGMS	Utah Geological and Mineralogical Survey
UIDIS	Utah Industrial Development Information System
UP&L	Utah Power and Light Company
USBR	United States Bureau of Reclamation
U.S.C.	United States Code
USDA	United States Department of Agriculture
USDC	United States Department of Commerce
USDES	Utah State Department of Employment Security
USDHEW	United States Department of Health, Education and Welfare
USDI	United States Department of the Interior
USFS	United States Forest Service
USGS	United States Geological Survey
USHPO	Utah State Historical Preservation Officer
USPHS	United States Public Health Standards
UURI	University of Utah Research Institute
VTN	Voorheis, Trindle, and Nelson (a firm of engineers, architects and planners)
W	west
WGREPO	Western Governors' Regional Energy Policy Office

LIST OF ABBREVIATIONS

(Units of Measure)

acre-ft/yr	acre foot (of feet) per year
AUM	animal unit month
Btu	British thermal unit
F	Fahrenheit
ft^3/h	cubic feet per hour
ft^3/s	cubic feet per second
gal/d	gallons per day
gal/min	gallons per minute
dB	decibel
dBa	weighted (or adjusted) decibel
km	kilometer
kV	kilovolt
kWh	kilowatt hours
lat.	latitude
long.	longitude
mg/ℓ	milligrams per liter
Mg/m^3	megagrams per cubic meter
$\mu g/m^3$	micrograms per cubic meter
mi	mile
mi/h	miles per hour
mi/gal	mile per gallon
m/s	meters per second
MVA	megavolt ampere (equals MW)
MW	megawatt
pH	hydrogen ion concentration

LIST OF ABBRVIATIONS (continued)

p/b	parts per billion
p/m	parts per million
lb/in^2	pounds per square inch
standard ft^3	standard cubic feet
standard ft^3/min	standard cubic feet per minute
t/d	tons per day
UTM	Universal Transverse Mercator
$\mu g/m^3$	micrograms per cubic meter
µm	micrometer

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